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Quality, rather than tonnage, Macwhyte aim

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Over the years, this policy of "quality rather than tonnage" has proved sound. For today there are more users of Macwhyte PREformed and Regular Wire Lines than ever before.

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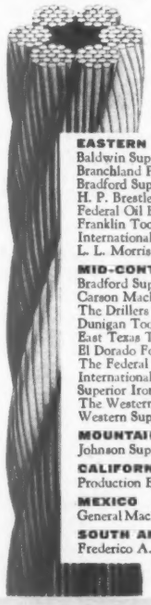

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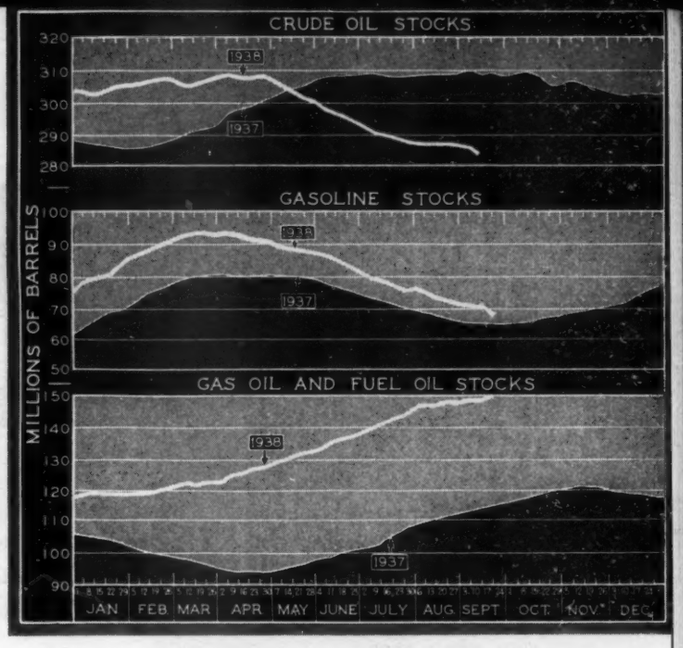
THE ROTARY LINE WITH THE INTERNAL LUBRICATION

Trends

Change in Markets Points to Need for Reduced Still Runs


CRUDE OIL STOCKS
GASOLINE STOCKS
GAS OIL AND FUEL OIL STOCKS
MILLIONS OF BARRELS
1938
1937
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

MARKET students are in substantial agreement that the next move in bringing about the fall and winter operating adjustments needed to balance petroleum supplies and demand rests with refiners and natural gasoline manufacturers. They point to recent statistical data showing that while national crude oil production has been reduced approximately 200,000 barrels daily the decline in refinery crude runs to stills has been less than half that amount. Runs to stills so far this month have been approximately 100,000 barrels daily greater than the average for the first half of the year and are only slightly less than those of August, the peak period of the year.

CRUDE PRODUCTION *3,230,268 barrels daily average—up 22,349. One year ago 3,676,006 barrels.*

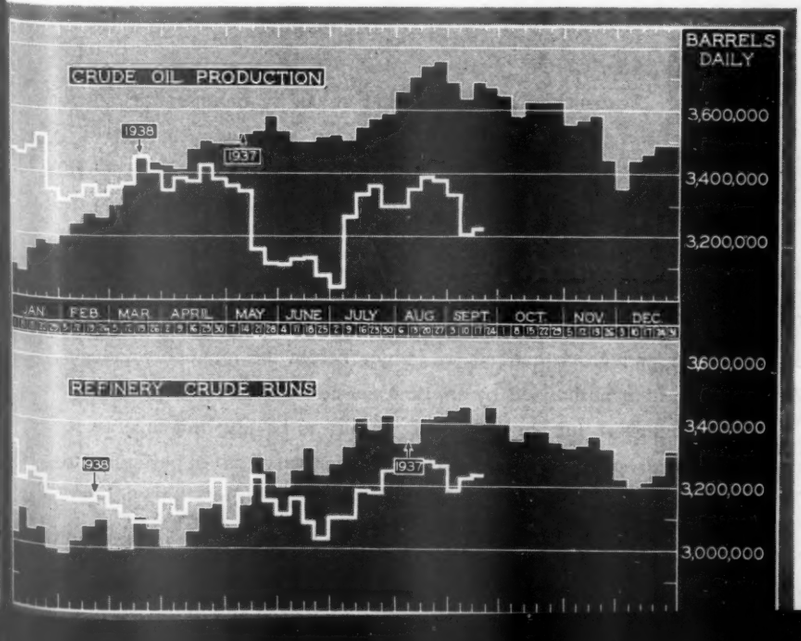
CRUDE STOCKS *282,457,000 barrels as of September 10—down 2,462,000. One year ago—309,054,000 barrels.*

GASOLINE STOCKS *69,244,000 barrels as of September 17—down 1,616,000. One year ago 66,057,000 barrels.*

GAS AND FUEL OIL STOCKS *149,388,000 barrels as of September 17—up 284,000. One year ago 116,178,000 barrels.*

REFINERY RUNS *3,235,000 barrels daily week ending September 17—up 10,000. One year ago 3,400,000 barrels.*

Weakness in gasoline and some of the other refinery products and stock accumulations are pointed to in support of the contention that these continued heavy refinery runs are not justified and must be reduced immediately if more serious market difficulties are to be avoided. With gasoline stocks at the end of the summer 5,000,000 barrels above those of a year ago, persons in close touch with conditions were hopeful that runs to stills could be curtailed to the point where steady reductions would continue through September and also through October if necessary to bring about a sound statistical situation in that product. With an actual increase in stocks for the week ending September 10 this objective cannot be attained unless crude runs to stills are lowered.



In this connection these same analysts fear that the projected demands for gasoline over the second half year may prove to be too high. They call attention to the 6 per cent reduction in July domestic demand shown by the Bureau of Mines report following a six-month period in which domestic shipments had been slightly in excess of the same period in 1937. There are no conclusive data since the July report but it is known that the August gallonage of some of the large and small marketing companies ran slightly behind August last year.

The situation in regard to heavy fuel oils is not all that had been hoped for. With stocks of heavy and light fuel oils about 35,000,000 barrels higher than a year ago it was expected that increases would end during September due to an enlarged demand from all classes of consumers. While the early season shipments of the lighter overhead oils have been satisfactory there have been no indications of substantial gains in heavy oil consumption, and the market continues weak. In the meanwhile stocks continue to accumulate.

These current figures relating to stocks are being presented to show that crude runs to stills should be reduced to around 3,100,000 barrels daily. Such a development might require further reductions in crude production in several areas next month.

DAILY AVERAGE PRODUCTION FOR WEEK

	Sept. 17, 1938	Bur. Mines Sept. est.	Sept. state allowables	Sept. 10, 1938
Oklahoma City	105,250	.....	.....	107,125
Fitts	38,300	.....	.....	38,850
Remainder of State	303,225	.....	.....	301,525
Total Oklahoma	446,775	528,300	428,000	447,500
East Texas	368,498	.....	.....	368,349
West Texas	187,597	.....	.....	186,350
North Central Texas	98,400	.....	.....	97,200
Texas Panhandle	64,149	.....	.....	61,298
East Central Texas	90,050	.....	.....	90,850
Gulf Coast Texas	312,750	.....	.....	313,998
Southwest Texas	93,250	.....	.....	92,600
Total Texas	1,214,694	1,398,600	1,233,248	1,210,645
North Louisiana	75,630	.....	.....	80,330
Gulf Coast Louisiana	190,900	.....	.....	190,759
Total Louisiana	266,530	255,300	260,260	271,089
California	678,400	638,300	610,000	665,900
Kansas	167,050	168,000	165,000	154,300
Arkansas	51,890	53,700	.....	58,355
Illinois	78,751	49,000	.....	77,947
Michigan	53,968	57,000	.....	51,192
Eastern Fields	95,150	100,300	.....	95,100
New Mexico	105,930	111,600	106,000	107,130
Rocky Mountain area	71,130	84,200	.....	68,770
Total United States	3,230,268	3,444,300	.....	3,207,919

SPARKS FROM THE NEWS

DIFFERENCE

While other transportation agencies have run to Washington seeking the various forms of subsidies, pipe line companies have expanded and modernized their operations with their own money.

WHY?

With the market for gasoline and several other products weak refiners continue to maintain crude runs to stills considerably above the average for June and July.

SMACKOVER CUT

Reduction in Smackover crude oil prices reflects reduced value of low-gravity crudes due to fuel oil markets.

NO SATURATION

Natural gas sales have expanded rapidly in recent years but the possible industrial and domestic markets have only been touched.

REPEAT

Another investigator finds gasoline quality improved, service par-excellent and prices lower than other commodities.

BLOWOUT CANYON

Not a small canyon, but a crater 300 feet wide and 70 feet deep as a result of a blowout in the Agua Dulce field, Nueces County, Texas. It was extinguished, after it had burned 21 months, by a triple shot of 60 quarts of nitroglycerin, above and on bottom of the crater floor

GASOLINE NETWORK

Developments over past year indicate that a network of gasoline pipe lines connecting to consuming centers similar to natural gas trunk-line distribution is within the realm of possibility within a few years.

MORE TRUTH

"Washington Keeps Us Guessing" was the subject of a N.P.A. address at Atlantic City which led a tax-burdened refiner to observe that is not all that it keeps.

HEADED FOR TROUBLE

A cooperative association is to build a refinery in Kansas which means that a group of consumers for the first time is to obtain first-hand information regarding the hazards of the oil business.

NO SENTIMENT

A "Buy Kansas Oil Products" campaign is being sponsored to aid Kansas operators. Similar movements have been tried before with results indicating a peculiar and discouraging lack of sentiment among consumers when it comes to buying gasoline.

ENCOURAGING

Indiana which has been trying to edge in and obtain a large share of the South Illinois development was encouraged last week with two sizable producers.

TEXAS ACTION

Texas checks it up to other states by announcing that it will continue Saturday and Sunday shutdowns in October. Cooperation should come from the "free riders" who have expanded their operations while others have curtailed.

TO BE AIRED

All pending matters pertaining to oil and government appear to be headed for airings before the monopoly investigation authorized by the last session of Congress. The committee so far has indicated a desire to be fair and anxious to hear all sides thus giving the industry an opportunity to present its case in full.

Transportation by Pipe Lines

By WALTER M. W. SPLAWN
Chairman, Interstate Commerce Commission

Harris & Ewing

WALTER M. W. SPLAWN, author of this article specially prepared for the Pipe Line Number of The Oil and Gas Journal, enjoys a national reputation as an authority on transportation. He was elected chairman of the Interstate Commerce Commission, January, 1938. He was at one time a member of the Texas Railroad Commission and was named by President Roosevelt a member of the Interstate Commerce Commission in 1934. He was special counsel for the Committee on Interstate and Foreign Commerce in the investigation of railroad-holding companies during the Seventy-first Congress and was special counsel in immediate charge of the investigation of pipe lines by that committee in 1932, compiling the report of that inquiry which was published in 1933 and attracted the immediate attention of the oil industry.

One of the most impressive things that one encounters when he attempts to respond to the invitation to contribute something to your review of the oil and gas pipe line industry is how much has been written and how much is yet to be definitely recorded.

One has to search widely to get a more comprehensive covering of oil and gas pipe lines than that afforded by a reference to the Diamond Jubilee Number of The Oil and Gas Journal, 1934. There still linger in mind from its reading several summary statements: * * "Nothing man has taken from the earth has changed human life so quickly and so extensively as petroleum." * * "The discovery of gold in California and Alaska enriched but a comparatively few; the discovery of oil lengthened the days and widened the horizon of mankind." And then the quotation from "God's Gold": "When John D. Rockefeller was young a candle burning in a cottage, the sound of horses' hoofs upon a dirt road, the muffled thump of the water wheel in the mill, represented the light, power and transportation of America."

Amazing Growth

Now, oil contends with water and coal for the supremacy of power that drives our industries; more than 25,000,000 passenger cars and more than 4,000,000 trucks speed over hard-surfaced highways brought into existence in less than a quarter of a century by the development of the gasoline and oil-burning engine—even our national death rate has been increased by this traffic; locomotives and steamships are propelled by oil; homes are heated and man contests with the eagles the supremacy of the heavens and delves into the depths of the ocean by the gift of oil. All of this has come about so suddenly that the statistical, quite different from the historical, record of growth has not given us a complete record of the span of years of growth and development, since Colonel Drake tapped our national oil resources in western Pennsylvania.

The spread of the vast network of pipe line systems, which in the case of oil and gasoline alone now runs up to the rather astounding total of more than 96,000 miles of interstate, and more than 17,500 miles of intrastate pipe lines, has been extended under the surface of the nation so unobtrusively and unspectacularly that it has not attracted national attention.

Of course, that statement has to be qualified for there have been exciting times in the oil industry that now and then have focused national attention. There has been much local tension at times; but still it is a fact that, nationally speaking, there is extremely limited appreciation of the fact of the extensiveness of the transportation system that lies underneath the surface of the country. And still, taking the past year as an example, more than 1,215,000,000 bbls. of crude oil and 75,000,000 bbls. of gasoline were transported and moved in interstate transportation by pipe line; and the system is so extensive that it is estimated that more than 5,000,000 bbls. of petroleum and gasoline could be moved in 24 hours. The estimates of crude oil transported by interstate pipe line last year place its value at more than $1,500,000,000, and to this should be added another $182,000,000 of gasoline. These estimates are based on value at refineries.

Major Facts

Oil is found in limited areas and the largest deposits are far from the great consuming regions of the country. For that reason transportation from the very beginning has been one of the major factors in the oil industry. At first, oil was transported by teamsters over trails that could hardly be dignified by the name of roads and often through open fields; then by water and rail. The pipe line was found to be such an economical and convenient means of transportation that it transformed the industry. It first took the traffic from the teamsters. Later the pipe line and tankers began to take it from the railroads. Through gathering lines it is carried safely from wells to tanks for transportation. Through trunk lines it is carried from remote oil fields and sparsely settled regions for hundreds of miles over plains and over mountains to refineries adjacent to the great cities.

The average gathering line is approximately 4 inches in diameter; the average trunk line is 8 inches. The oil moves through trunk lines at a maximum speed of about 4 miles per hour. The average cost of pipe line is approximately one-tenth of a mile of railroad line. The tanker is said to be a less expensive means of transporting oil than pipe line. With improvements in pipe lines and in the machinery for boosting the oil through them, the expense of transportation by pipe line was decreased.

When a pipe line once was laid then the oil companies had pecuniary interests in using their own facilities instead of patronizing independent agencies. Once the

size and life of a field were estimated, it was easy to determine whether or not the pipe line would be profitable. After the pipe line was laid to a field, the oil, and more recently, gasoline, flowed through it because it was economical and profitable. The growth and the improvements of transportation by pipe line can be grasped by considering first, transportation of crude oil; second, of gasoline, and third, the regulation of such transportation.

Table 1 shows the growth of the pipe line industry restricted to interstate carriers from 1906 to 1937, inclusive, and of carriers conducting a similar type of business prior to 1906.

I have referred to the fact that there is an inadequacy of records. This applies particularly to the period prior to the requirement of keeping and reporting of uniform records. The work of inventorying, recording and valuing the pipe lines by the Bureau of Valuation of the Interstate Commerce Commission has, as one of its features, been accompanied by gathering a great deal of material from all sources. These are incorporated in the development of the accompanying chronological chart. It is offered as being, it appears to me, the best summary available. If any corrections can be offered by anyone they will be welcomed.

Table No. 2 shows mileage, investment, and barrels transported from 1918 to 1937, inclusive, for such carriers as reported to the Interstate Commerce Commission.

TABLE 1

Year—	Mileage— Trunk	Gathering	Total
1879	322	372	694
1880	702	514	1,216
1881	1,215	619	1,834
1882	1,386	687	2,073
1883	1,427	810	2,237
1884	1,427	948	2,375
1885	1,427	1,062	2,489
1886	1,496	1,126	2,622
1887	1,655	1,165	2,820
1888	1,953	1,609	3,562
1889	2,097	1,995	4,092
1890	2,933	2,457	5,390
1891	3,491	3,118	6,609
1892	4,956	3,594	8,550
1893	5,446	4,344	9,790
1894	5,493	5,132	10,625
1895	5,720	6,387	12,107
1896	6,306	7,268	13,574
1897	6,478	8,302	14,780
1898	6,673	9,107	15,780
1899	6,673	9,990	16,663
1900	6,821	11,152	17,973
1901	7,422	12,392	19,814
1902	7,744	13,056	20,800
1903	7,976	13,799	21,775
1904	8,305	14,686	22,991
1905	9,337	15,329	24,666
1906	11,065	16,000	27,065
1907	13,504	17,955	31,459
1908	14,532	20,153	34,685
1909	15,708	22,240	37,948
1910	16,226	23,864	40,090
1911	16,604	23,808	40,412
1912	17,446	23,752	41,198
1913	17,660	23,696	41,356
1914	18,595	23,640	42,235
1915	18,975	23,584	42,559
1916	19,441	23,528	42,969
1917	20,944	23,472	44,416
1918	22,157	23,415	45,572
1919	24,435	24,867	49,302
1920	25,330	27,663	52,993
1921	26,935	28,385	55,320
1922	26,449	30,900	57,349
1923	33,139	31,621	64,760
1924	33,763	34,422	68,185
1925	34,768	35,241	70,009
1926	35,097	37,749	72,846
1927	37,385	38,685	76,070
1928	39,423	40,685	80,108
1929	44,307	41,489	85,796
1930	45,922	42,806	88,728
1931	51,287	41,803	93,090
1932	51,404	41,378	92,782
1933	52,865	40,859	93,724
1934	53,405	39,665	93,070
1935	52,657	39,380	92,037
1936	54,460	39,600	94,060
1937	56,811	39,800	96,611

Transportation of Gasoline by Pipe Line

According to Technical Paper 517 issued by the U. S. Department of Commerce in 1932, the first relatively long line for transporting natural gasoline was constructed in 1912 in Orange County, California, by Pacific Gasoline Co. It was 2 inches in diameter and extended from Brea Canyon to a loading rack near Brea, a distance of about 2 miles. In 1913, Pinal Dome Oil Co. constructed a 2-inch pipe line to transport natural gasoline from the Santa Maria oil field, Santa Barbara County, California, to a refinery at Betteravia, a distance of 16 miles. This line was operated by gravity. In 1914, Union Oil Co. of California constructed a 2-inch line for transporting natural gasoline from Orcutt, Santa Barbara County, to Avila, San Luis Obispo County, California, a distance of about 30 miles. In 1915, Peoples Natural Gas Co., of Pittsburgh, Pa., completed a 2-inch line to transport natural gasoline from the company's absorption plant at Brave, Green County, Pennsylvania, to the Pennsylvania Railroad, at Marianna, Washington County. It is believed this was the first gasoline line constructed in the Pennsylvania fields.

For many years, plants producing natural gasoline in various oil fields of the United States have been pumping their product through short lines directly into the crude-oil transportation systems or through specially designed systems to refineries or convenient points along the railroads, where the gasoline is loaded into tankcars.

There has been much activity in recent years in the construction of interstate pipe lines for the transportation of gasoline, as indicated in Table 3:

In 1930, only one company, namely Tuscarora Oil Co., Ltd., a subsidiary of Standard Oil Co. of New Jersey, was engaged in the interstate transportation of gasoline. Prior to February 1, 1930, this pipe line had been used exclusively to transport crude oil from western Pennsylvania to refineries located on New York Harbor. Subsequently, it operated to handle both crude oil and gasoline. The gasoline line at present extends from Bayway, N. J., to Midland, Pa., near the Ohio state line, a distance of about 371 miles.

TABLE 3—STATISTICS OF INTERSTATE PIPE LINE COMPANIES TRANSPORTING GASOLINE

Year—	No. of companies at end of year	Mileage— All trunk line	Investment	Gasoline transported (barrels)
1930	1	371	*$7,035,224	*6,806,831
1931	6	3,333	41,033,327	19,008,201
1932	6	3,331	42,132,745	27,960,770
1933	7	3,458	44,165,651	37,911,890
1934	7	3,629	44,615,543	44,780,081
1935	8	4,065	48,613,544	49,325,778
1936	8	4,209	50,906,767	56,906,697
1937†	10	5,242	61,045,819	74,182,743

*Includes both crude oil and gasoline operation.
†Subject to change.

Busy Year

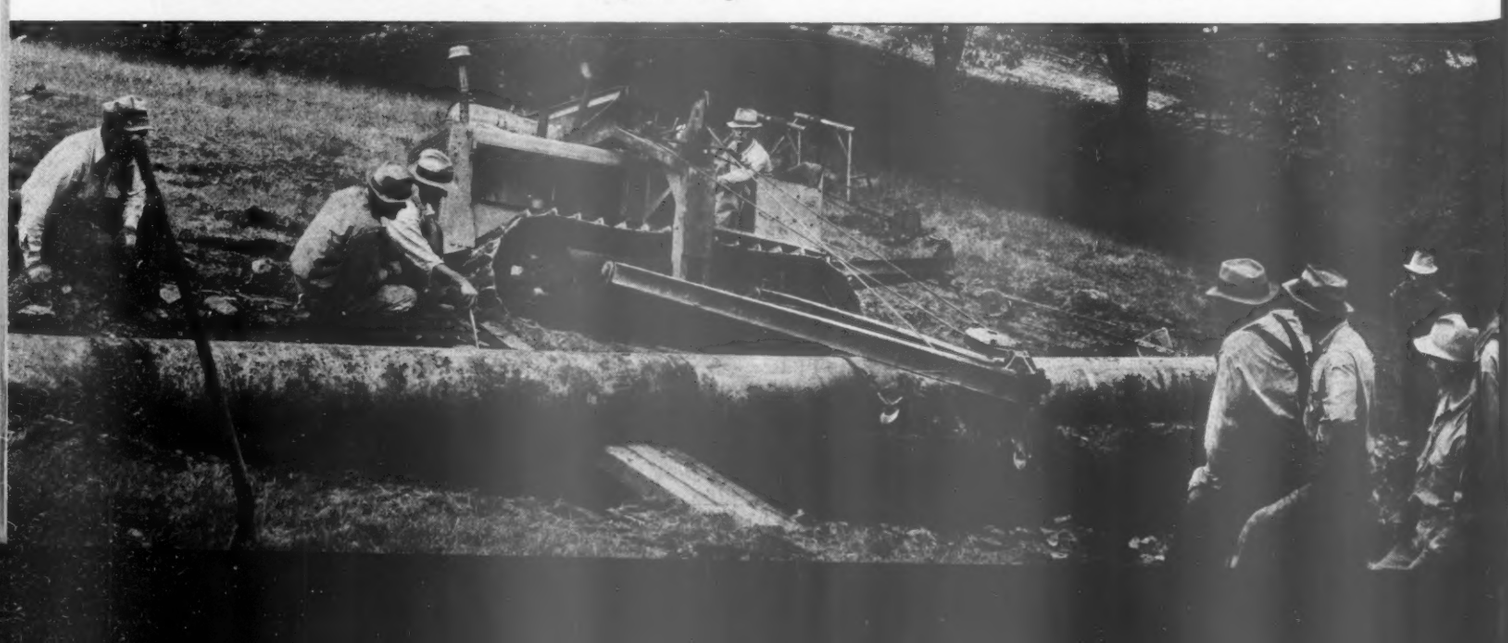
By the end of 1931, five additional gasoline pipe lines had been constructed and placed in operation: Great Lakes Pipe Line Co., jointly controlled by Continental Oil Co., Skelly Oil Co., Barnsdall Corp., Mid-Continent Petroleum Corp., Pure Oil Co., and Phillips Petroleum Co., built a line extending from refineries at Muskogee, Okmulgee, Tulsa, and Ponca City, Okla., and Independence, Humboldt, and Kansas City, Kans., across northwestern Missouri to Osceola, Iowa, at which point one line diverges west to Omaha, Neb., and the other continues on through Des Moines, Iowa, to Minneapolis, Minn. From Des Moines, a line reaches east to Chicago. The mileage aggregates 1,541 miles. Important terminal facilities are situated at Kansas City, Kans.; Des Moines and Coralville, Iowa; Omaha, Neb.; Minneapolis, Minn., and Chicago, for the storage and distribution of gasoline. At each of these terminals are Ethyl facilities for blending gasoline before it is delivered to tankcars or tank trucks.

Phillips Pipe Line Co., a subsidiary of the Phillips Petroleum Co., built a gasoline pipe line from Pampa and Borger, Tex., through northwestern Oklahoma and southeastern Kansas to Paola, Kans., whence a line extends north to Kansas City, Kans., and east across Missouri to East St. Louis, Ill., a total distance of 736 miles.

Susquehanna Pipe Line Co., Sun Pipe Line, Inc., and Sun Oil Co., all subsidiaries of Sun Oil Co., built a system of gasoline pipe lines extending from the refinery at Twin Oaks (Marcus Hook) to Icedale, Pa., and thence north to Syracuse, N. Y., and west via Allegheny, Pa., to Youngstown, Akron, and Cleveland, Ohio, a total distance of 732 miles.

No additional interstate gasoline lines were constructed until 1933 when Detroit Southern Pipe Line Co., a subsidiary of Pure Oil Co., built a line from the refinery at Toledo, Ohio, to Detroit, Mich., a distance of 82 miles.

By the end of 1935, Keystone Pipe Line Co., a subsidiary of Atlantic Refining Co., became an extensive carrier of gasoline. This company had built a line from the refinery at Point Breeze, Philadelphia, to Reading, Wilkes-Barre, and Pittsburgh, within the State of Pennsylvania, aggregating 462 miles. This carrier extended its system 128 miles in 1937 by constructing a line from Cornwall, through Williamsport, to the New



PIPE LINE MILEAGE

Crude Oil - - 115,000 Natural Gas - - 180,000

Gasoline - - - 6,000 Natural Gasoline - 15,000

Investment - - - - - - - $3,500,000,000

York-Pennsylvania state line, where it connects with an affiliated line.

In 1937, two additional lines entered the field of transporting gasoline by means of pipe lines. Buffalo Pipe Line Corp., a subsidiary of Atlantic Refining Co., built a line in New York State from the Pennsylvania-New York state line, north of Williamsport, where connection is made with Keystone Pipe Line Co. to Rochester and Buffalo, a distance of 161 miles, while Middlesex Pipe Line Co., a subsidiary of Sun Pipe Line Co., constructed a line extending from a connection with Susquehanna Pipe Line in the middle of Delaware River at Washington's Crossing to Newark, N. J., a distance of 56 miles. The gasoline handled by this latter carrier originates at Twin Oaks, Pa.

Shell Petroleum Corp. now has under construction a gasoline pipe line extending from the Roxana refinery, Wood River, Ill., via Indianapolis, Ind., to Toledo and Columbus, Ohio.

A complete statement of the intrastate companies transporting gasoline by pipe lines is not available. It is known, however, that Socony-Vacuum Oil Co. owns a line running from its refinery at East Providence, R. I., to bulk plants at Worcester and Springfield, Mass., a distance of about 100 miles, which was built in 1931. This same company also owns a gasoline line in Kansas extending from its refinery at Augusta via Topeka to a terminal adjacent to Kansas City, a distance of 176 miles, all of which was constructed in 1936. United States Pipe Line Co., a subsidiary of Pure Oil Co., owns a gasoline line within the State of Pennsylvania extending from the Marcus Hook refinery to Freemansburg, a distance of 58 miles. Champlin Refining Co. owns a gasoline line from its refinery at Enid, Okla., to Hutchinson, Kans., and Superior, Neb. Hanlon Pipe Line Co. owns about 35 miles of gasoline pipe lines extending from plants in Joiner, Kilgore, and Longview areas of East Texas to the London station of Humble Pipe Line Co.

In recent years several of the companies engaged in transporting crude oil have entered the gasoline field. Texas Pipe Line Co., Humble Pipe Line Co., and Magnolia Pipe Line Co., in particular, now transport large quantities of refined products yearly.

In California, there are also several relatively long natural gasoline lines. Shell Oil Co. operates a 6-inch line, about 100 miles long, extending from near Ventura to Wilmington, and Union Oil Co. of California, a 6-inch line, 80 miles long, extending from Kettleman Hills field in the San Joaquin Valley to Avila, San Luis Obispo County. Associated Oil Co. has a 6-inch line, 170 miles long, from various San Joaquin Valley fields to Monterey, and Standard Oil Co. of California, a 10-inch line, 70 miles long, from Kettleman Hills to Morro, San Luis Obispo County.

Having in mind the demand for increased pipe line facilities for transporting gasoline, Ajax Pipe Line Co. constructed 785 miles of 10-inch pipe line in 1930, extending from Glenpool, Okla., through the State of Missouri to Wood River, Ill. While this line was designed to handle gasoline, it has thus far transported only crude oil.

Federal Regulation

Power to regulate pipe lines was conferred on the Interstate Commerce Commission by the Hepburn Act of 1906. At that time the Bureau of Corporations in the Department of Commerce had prepared a special report on transportation and freight rates in connection with the oil industry. The commission, in its decision, *In the Matter of Pipe Lines*, dated June 3, 1912, held that Congress had made interstate pipe lines common carriers even though they bought the oil at the producing well and transmitted it as their own property (24 I.C.C. 1). But few cases relating to pipe lines have subsequently come before the Interstate Commerce Commission. In Docket 26,570 the commission is now making a survey of the rates, rules, and practices of the important pipe line companies. The hearings are not yet completed. In 1934 the commission ordered a valuation of oil pipe lines.

There has been completed a gigantic task of inventorying all property owned by pipe line companies engaged in interstate transportation of crude oil throughout the United States. This work was commenced in May, 1935, under the direction of the Bureau of Valuation, Interstate Commerce Commission, and, with a few exceptions was completed in less than one year. The work entailed the inventory of more than 93,000 miles of trunk and gathering lines, the major portion of which is located in the Southwest, or throughout the States of Oklahoma and Texas. There are some 17,500 miles of intrastate lines which do not come under the jurisdiction of this commission and these are not being valued by the Interstate Commerce Commission. In addition to the pipe lines, all physical property, such as pumping stations, machinery, tank farms, and terminal facilities, was set out in detail on field forms. All lands and rights of way were appraised, while accountants have made a careful analysis of the books, maintained by the pipe line companies to determine original cost and other pertinent information.

The various pipe line companies, originally numbering 53, to which a few have been added, cooperated to the fullest extent in making this work possible. An order, issued by the Interstate Commerce Commission, required the pipe line companies to make the inventory with their own forces of trained men familiar with the particular property encountered. The inventorying was under the supervision of the commission's valuation engineers, all of whom have had years of experience in making valuations of property owned by railroad companies. In organizing this phase of the work, the United States was divided into districts and the commission established temporary headquarters at Houston, Tex.; Tulsa; St. Louis, Mo., and Pittsburgh, Pa. Located at each headquarters were three of the commission's engineers, who checked

(Continued on Page 66)

Starting Page 89

You will find special articles, maps, pictures, personnel and statistical data pertaining to pipe line construction and operating practices

Geneseo Example of Orderly Operation

By DAL DALRYMPLE

The Geneseo pool in northern Rice County stands out among Kansas oil fields as an example of economical and orderly development. Potentially one of the richer and more productive areas of the state, it has had no intensive, wasteful drilling boom in the more than four years of its history, the operators being content with a conservative program designed for maximum recovery and long life of the wells.

First field work in the area was started in April 1934 by Continental Oil Co. on a large block it had assembled in the vicinity of the town of Geneseo. In May of that year the company opened the pool at its No. 1 Lansing, NW NW SE Section 25-18-8w, nearly 4 miles south of Geneseo. The discovery well had initial potential of 899 bbls. of 40-gravity oil daily from Arbuckle lime at 3,132-72 feet.

Several dry holes have been drilled in and near the pool, but some of them offset producers and do not limit production. Three dry holes are shown along the southeast side of the field, apparently stopping development in that direction. They are offset by producing wells, however, and may not be conclusive. Dry holes also are found at the north end of the field, one failure east of the field in Section 18-18-7w, and two west of production in Sections 23 and 26-18-8w.

Limits Undefined

The Edwards or Northwest Geneseo pool is 1½ miles west of the town of Geneseo, in Townships 17 and 18-8w, Ellsworth and Rice counties. Development in that area started early in 1936, production being found at C. E. Skiles and others No. 1 Edwards, NW NW NE Section 3-8s-8w, in March of that year. The oil is of high gravity and comes from Arbuckle lime, average depth of producing wells being 3,250 feet. Continental Oil Co. also is the largest operator in this sector, having gross leases covering 4,640 acres. Other operators include Cities Service Oil Co. and C. B. Davis.

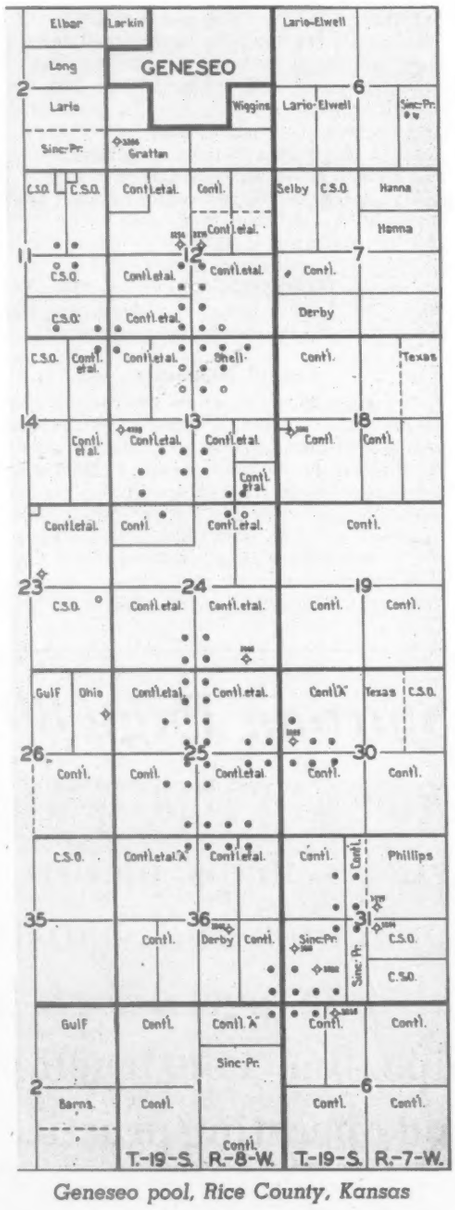
The Edwards pool has not been defined although it, too, has had some dry holes. There is considerable unproven and undrilled territory between it and the Geneseo field. Recent extensions of the northwest sector of Geneseo indicate that the two areas may be joined eventually. Whether or not this occurs, numerous tests are likely to be drilled in the intervening area before either pool is delimited.

Both sectors are served by Continental and Kaw pipe lines. Crude from Geneseo is moved through Continental's 8-inch line to its refinery at Ponca City, Okla.

The 80 wells in the Geneseo pool, as listed in the September 1 report of the Kansas Corporation Commission, were divided as follows: Continental Oil Co., 66 producing wells with total potential of 114,492 bbls.; Shell Petroleum Corp., four wells with total potential of 11,332 bbls.; Sinclair Prairie Oil Co., six wells, total potential 10,041 bbls., and Cities Service Oil Co., four wells, total potential 5,911 bbls.

In the Edwards pool, Continental had 21 wells with total potential of 16,673 bbls. as of September 1; Cities Service, nine wells, total potential 5,157 bbls.; C. B. Davis, four wells, total potential 1,799 bbls., and Moyen and others, one well, 25 bbls.

The Geneseo field is located geologically on a range of buried hills, more than 3,000 feet below the surface. Although the surface of the buried hills was irregular, the oil accumulation has been so great that the water level is 123 feet below top of the Arbuckle lime at its highest point at the top of the hills. The lime has been penetrated from 80 to 90 feet in several of the wells which have found oil pay throughout the horizon to total depth, with no water. The pool's elevation above the water line is considerably greater than that usually found in pools along the central Kansas uplift. It is the belief of some geologists that Geneseo may become the largest of Kansas oil pools, with indications now that it will have a productive area of 3,000 acres or more.



Geneseo pool, Rice County, Kansas

Another feature that makes Geneseo attractive is the possibility of future production from pay horizons above Arbuckle lime. Some Simpson, or Wilcox, sand production has been found in two wells, one in Section 36-18-8w and one in Section 31-18-7w. In the first mentioned well, Simpson sand production totaling 579 bbls. of oil daily on the pump was had from the sand at 3,154-80 feet. Production declined after several weeks and it was deepened to the Arbuckle zone at 3,190-3,230 feet for potential of 1,839 bbls. daily. Wells now producing from the Arbuckle and those yet to be completed in that prolific horizon may be plugged back later to gain production from the upper sand zone.

Second Largest Potential

Geneseo rates fourth in Rice County in number of producing wells, but is second in total potential. Most recent Corporation Commission figures for the larger Rice County pools were as follows:

Pool—	Wells	Daily potential	Sept. allowable	Percentage
Chase	231	55,783	139,504	4.48
Edwards	35	22,170	34,418	4.10
Geneseo	80	141,776	82,996	2.00
Habiger	24	81,558	28,868	1.15
Silica	437	470,858	321,631	1.87
Wherry	159	95,421	104,193	2.85

Rice County's Prominence

As Geneseo stands out among Kansas pools, so Rice County rates among Kansas oil-producing counties. Exceeded only by Russell County in total potential, Rice County has more producing wells than any of the western Kansas counties and leads them all in daily average production. During the past week there were 1,205 wells in Rice County with daily average yield of 28,692 bbls. of oil, as against Russell County's 1,132 wells with daily average of 25,913 bbls.

Rice County has the largest gas well in the state at Atlantic Refining Co. No. 1 Pulliam, NE Section 35-19-8, with 150,000,000 feet open flow and rock pressure of 1,060 pounds. It is said to have the largest oil well ever completed in western Kansas at the L. E. Douglass No. 2 Hauschild, NW Section 15-21-7, Wherry pool, with initial potential of 15,149 bbls. of oil daily from conglomerate. Its Silica pool is one of the state's major producing areas, rating with Burrton, Trapp and Bemis in total potential and daily production; Silica, however, is partly in Barton County. It has the leading field producing from conglomerate in Kansas, in the Wherry pool. The highest gravity oil yet reported in western Kansas was found in Rice County at Steinbuchel and Hilligoss No. 1 Schurr, SE NW Section 21-10-10w, Raymond pool, producing 200 bbls. of 53.4-gravity oil initially from conglomerate. It has production from pre-Cambrian quartzite at Slick, Pryor & Lockhart No. 1 Godfrey, NW SW Section 27-18-10w, reputed to be the only area in the world producing from that formation. It had 35 oil pools in a recent compilation, but that number may be changed slightly by the time this is in print, for new pools are opened and old pools consolidated in Kansas at a rapid rate. Total production of all Rice County pools in 1937 was more than 15,000,000 bbls. of oil—a considerable figure when it is realized that most of the production was prorated under 4 per cent during the year.

A great record already has been made by Rice County but the end is not in sight. Not one of the important pools in the county has been completely defined.

Hess photo

Thirty-sixth annual meeting, National Petroleum Association, Atlantic City, N. J.

Head of "Monopoly Probe" Explains It Before N.P.A.

By HENRY D. RALPH

ATLANTIC CITY, N. J., Sept. 16. The increasing impact of government activities upon the every-day operations of business was the theme that ran through the entire three-day program of the thirty-sixth annual meeting of the National Petroleum Association at the Traymore Hotel.

That this ever-growing relationship between government and business should and can be one of mutual trust and cooperation was stressed by Senator Joseph C. O'Mahoney of Wyoming, whose address on "The Inquiry Into American Business" was the high point of the convention. As chairman of the Temporary National Economic Committee, which is just launching on the study commonly referred to as the monopoly investigation, the senator told the oil men the inquiry is in no way hostile to business, but that its objective is to develop national solutions to economic problems which are national in scope, to find a way to free business from arbitrary controls and to stimulate private initiative so the national income can be raised to form the basis for an enduring prosperity.

This speech was so favorably received the association adopted a resolution thanking the senator for his contribution and pledging cooperation in the forthcoming investigation.

Other business included the reelection of the entire slate of officers and board of trustees, with the addition of one new member of the board. Noel Robinson, of Tide Water Associated Oil Co.

A resolution expressed sorrow at the death of Frank R. Coates, president of Cities Service Oil Co. and long active in the association.

Guest speakers at the general sessions, in addition to Senator O'Mahoney, included Charles J. Brand, executive secretary and treasurer of the National Fertilizer Association, who spoke on "The Development and Significance of American Trade Associations"; Joseph E. Pogue, vice president of the Chase National Bank, who spoke on "Gasoline and the Consumer"; Carle C. Conway, chairman of the board of the Continental Can Co., who spoke on "Business in America and Europe"; and Earl Godwin, president of the White House Correspondents Association, who told the oil men that "Washington Keeps Us Guessing."

Government and Business

In the absence of President Charles L. Suhr, who cabled greetings from Europe, the general sessions were conducted by Vice Presidents N. H. Weber and H. A. Logan. In his address Mr. Weber observed that the government's relation to business is steadily growing closer, making the activities of the National Petroleum Association of increasingly greater importance. He announced that at the April meeting in Cleveland the chief speaker will be Dr. Roswell Magill, an authority on taxation and until recently under secretary of the Treasury.

Greatest interest naturally centered in the speech of Senator O'Mahoney, since all business men are concerned over the course of the monopoly investigation.

The federal phases of business problems have been receiving increasing attention since the Sherman Antitrust Act was passed in 1890, the senator began, but insufficiently because business has developed on a national scale and has far outstripped the regulatory reaches of the federal Constitution and present federal laws. While our population has been shifting from rural to urban, methods of doing business have likewise changed with the growth of national corporations which now dominate the manufacturing field and much of the distributive trades. At present, 73 per cent of the wage earners and 83 per cent of salaried employes are found in 175 of the more than 3,000 counties in the United States, so that we have a tremendous concentration of population and also a concentration of business in corporate hands. The senator said he does not criticize this situation, but it must be realized farmers and consumers doing business as individuals must bargain with huge corporations.

Drawing a parallel with the national highway system which has wiped out state lines and permits a free flow of traffic throughout the country, Senator O'Mahoney said what we need now is a system of national routes for commerce which has become national in its scope. Business has expanded beyond the geographical lines of the states but the federal government has done nothing about it beyond pecking away at a few of the more conspicuous details through such actions as the Robinson-Patman and Tydings-Miller laws. It is time, he said, for business and government leaders to sit down in harmony and discuss the facts as they are, discover just what the problem is, and seek a solution. This will be the function of the Temporary National Economic Committee. It is not at all hostile to business, but it is designed to be helpful since the whole future of the country depends on developing a system for the more adequate functioning of business — a new national economic constitution, the senator called it.

Now that business is so largely conducted by corporations of national scope, the speaker continued, there is need for a revision of the system of government controls and sanctions because national prosperity now depends largely on the activities of corporations. For while a corporation is created by a state government, it can do almost any sort of business in any other state, and can virtually write its own ticket and its own rules. Mostly they are honest, efficient, and serve a

useful purpose in the national economy, but the door is open to abuses, and we need a national rule for business.

The Temporary National Economic Committee will study all phases of this situation, its chairman promised, and will attempt to develop national rules under which business can be set free to govern itself just as the states govern themselves within the framework of the federal constitution. Its purpose is completely objective, and it will not be used as a super grand jury to hunt out law violations. The senator stated parenthetically he will not attempt to use the committee to further his own bill for federal licensing of corporations provided some better suggestions are forthcoming. The whole point, he repeated, is that the states do not have the power to regulate the national businesses which they have created and it is time for the federal government to seek a solution.

Turning to business recession, the senator flatly declared government spending can never bring prosperity nor raise the national income to a point which will sustain a high level of business activity. Therefore, he reasoned, the job of both business and government is to stimulate private enterprise, to develop a system under which business will be free from arbitrary controls by financial interests, by private business groups, or by any public body. For, he asserted, government has neither the right nor the function to control the activities of the individual. The fundamental principle of our government is that the individual is the end of all government, that the inalienable rights of man are paramount; in the modern world other governments are taking away these rights but we have the opportunity to make the principles of democracy work from an economic standpoint. If business is to be successful we must find a way of raising the standard of living of the two-thirds or so of our families with incomes of less than $1,500 per year, we must organize American business to distribute more of our abundant resources to all of our people. It will be the function of the Temporary National Economic Committee to serve the common objective of business and government in finding ways of bringing this about.

The only technical paper presented was on "Propane Dewaxing and Deresining Pennsylvania Lube Oil Stocks," prepared jointly by W. B. McCluer, chief chemist, of Kendall Refining Co., and H. O. Forrest and J. T. Dickinson, of M. W. Kellogg Co. They explained refiners of Pennsylvania Grade crude are faced with three problems: increasing the neutral-bright stock ratio, improving the quality of the finished product, and lowering cost of production; the propane method aids in solving all three. It lowers the cost of dewaxing and decolorizing the residual products of refining Pennsylvania Grade, generally known as steam refined cylinder stock. During the past six years the neutral requirements for blending Pennsylvania oils have increased from 47 per cent of the finished product to 65 per cent because of the lighter oils demanded by modern motor cars. This has strained the refinery situation since manufacturers have been forced to run more crude to supply the neutral requirements, resulting in a surplus of bright stock. The paper showed that the propane method improves the ratio of neutral to bright stock obtained from crude from .36 to .81, or more than 100 per cent. It also substantially reduces manufacturing costs, and while it makes some improvement in the quality of bright stock produced it encourages further improvement in the quality of finished lubricating oil since it is not necessary to skin back the bright stock for further treatment.

Taxation Trends

A forecast of general taxation trends was given the group by Lovell H. Parker, until recently chief of the staff of the permanent joint congressional committee on taxation. Increasing government expenditures mean only higher state and federal taxes, he declared, and he predicted that additional state revenues will come more from sales taxes than from income taxes. The federal Government cannot increase its revenues by higher taxes on the rich, since these taxes have perhaps passed the point of diminishing returns as in 1934, 8,000 individuals paid 52 per cent of the tax yielded from more than 4,000,000 returns. There definitely will be a new tax law in 1939, he predicted, and the chief new source of revenue will come from broadening the income tax base to reach more individuals and from increasing the surtax on incomes below $50,000. This would be more like the British system and would be more stable in yield because of its broader base. Deductions for depletion, obsolescence and other factors will again be under fire because of the Treasury's desire to plug all alleged loopholes, but in Mr. Parker's opinion there will be no new manufacturer's excise taxes nor a general sales tax. This latter, with provisions for allocating part of the revenue to the states, will probably come in the future, but only after state and federal governments have reached an agreement to avoid overlapping taxation, a development which the speaker saw as an almost certain eventuality.

Truck Regulation

Considerable concern over the possibilities of federal regulation of privately owned motor trucks was evident at the meeting of the Department of Traffic and Transportation. J. F. Winchester, of Standard Oil Co. of New Jersey, who led the round-table discussion, warned emphatically that private carriers are on the brink of regulation although this is not generally realized by the heads of companies operating truck fleets. This movement is being accentuated by pleas of the railroads that trucking is driving them to bankruptcy and development of a "railroad crisis," but Mr. Winchester cited figures to show that the trucking industry is no more prosperous as a whole than the railroads.

The discussion centered around the proposed safety regulations for shipping dangerous articles by truck, just issued by the Interstate Commerce Commission. While most of those present had few objections to the technical rules for constructing and operating gasoline tank trucks and for packing, labeling and handling inflammable and other dangerous commodities when shipped by truck, it was felt these should be confined to common and contract motor carriers. The proposed regulations will be the subject of hearings in October, and the I.C.C. notice of hearing asks for testimony on the need for applying the regulations to private trucks as well as to common and contract carriers. It was agreed to petition the I.C.C. to postpone or eliminate this phase of the hearings, and to this end a steering committee was authorized to work with other interested groups, such as the American Petroleum Institute, Manufacturing Chemists Association, National Industrial Traffic League, and other shippers affected.

Firing line on the Continental's Wyoming-Colorado pipe line now under construction

Taxation Problems Discussed At N.P.A. Annual Meeting

ATLANTIC CITY, N. J.—Important trends in social security taxation and administration were discussed at a group conference of the Department of Taxation at the National Petroleum Association meeting here. John E. Winslow, of Shell Petroleum Corp., who led the discussion, pointed out that since the Bureau of Internal Revenue has ruled that commission operators of bulk distributing plants, as well as their employes, are all employes of the oil company, the present problem is to separate the gross commission into tax-exempt selling expenses and taxable compensation. His company first tried to have commission agents submit expense accounts, but even under threat of penalties imposed by the revenue laws, the agents would not or could not submit accounts sufficiently accurate to sustain claims for tax reduction. Therefore, the company worked out an average figure to represent the expense of selling light-refined products through its commission agents, and this has proved entirely satisfactory from the company's standpoint, eliminating delays and much computation. It has not yet been finally accepted by the taxing authorities, although most of the states where Shell does business have accepted it and also some local collectors of internal revenue, and the Federal Bureau of Internal Revenue is now studying the method. Various methods have been sanctioned by local revenue collectors. One collector ruled if reasonably accurate expense accounts are obtained from all but a few agents, an average figure could be used. Another company in some cases is reporting gross commissions for tax purposes, but with a note that some deductions should be made for expenses and that claims for refund may be filed.

Turning to state unemployment insurance, Mr. Winslow warned that, unless business men take a greater interest in this, the administrative costs may increase so much there will be pressure for raising the payroll taxes. The greatest potential saving lies in application of the merit-rating provisions. The savings in tax possible under the merit system may total several hundred thousands of dollars annually in a large corporation.

The administrative costs of unemployment insurance in many states are exceedingly costly, both to the government and to employers, Mr. Winslow pointed out, and there is pressing need for simplification. He felt the best method is used by Wisconsin where employers are not required to file quarterly reports for all employes, but submit the report for an individual employe only when that person files a claim for benefits; in this way state files are not filled with unused records, and employers are put on notice of all applications for payments.

The Department of Taxation agreed to the creation of a special committee to study social security trends.

Difficulties under the pipe line transportation tax were discussed under the leadership of J. R. Edmonston, assistant manager of the tax department of Gulf Oil Corp. He declared the original concept of this tax was that it should apply to such transportation as would usually be done for hire by a pipe line carrier in the usual course of its business, but departmental rulings and court decisions have broadened this concept until the tax is now being applied to many pipe line movements which are part of regular manufacturing and distributing processes, the tax theory being that such movements are merely the continuation of an interrupted pipe line transportation.

Richest Market for Natural Gas Awaits Pipe Line Builders

By H. STANLEY NORMAN

NEW YORK, Sept. 20.—Despite the fact that 180,000 miles of natural gas main transit and distribution pipe lines finger into parts of all but 15 states, including the District of Columbia, the richest potential market in the world remains unexplored. This highly attractive potential market is concentrated along the north Atlantic seaboard roughly bounded by Philadelphia on the south, Boston on the north and a projection of the western boundary of New Jersey to the two preceding points.

The most attractive potential natural gas market resting outside that area is Wisconsin, where in 1936 there were 358,080 customers who used 13,717,300,000 feet of manufactured gas during the year. The District of Columbia, North and South Carolina, Delaware, Idaho, Oregon and Nevada are the only states other than Wisconsin and New England entirely lacking natural gas distribution to some extent.

Despite the fact that a few cities in western and northern New York are served by natural gas facilities, the larger cities being Rochester and Buffalo, 88.8 per cent of the state's gas customers are supplied with manufactured gas. The State of New York, according to the 1936 annual summary of the American Gas Association, contained 3,003,540 gas customers, but only 334,450, or 11.2 per cent were served with natural gas.

Possibly indicative of the New York market potentialities, the 334,450 customers served with natural gas consumed 52,137,900,000 feet during 1936 or an average of 155,891 feet to each user. In contrast, the 2,669,090 customers served with manufactured gas each used an average of 32,042 feet during 1936.

How to capture, or at least participate in, the rich northern Atlantic seaboard market long has been a problem considered by the keenest engineers in the natural gas industry. Countless proposals for tapping metropolitan New York have been prepared, but so far the cost of all schemes has been considered prohibitive. In the densely populated East, the right of way requirements are a consideration of major importance, although this one phase of bringing natural gas to New York and other East Coast cities fades into insignificance compared with the other considerations involved.

Cost estimates on bringing natural gas service to the extreme northeastern seaboard vary with the steel market, labor conditions and the status of general business. When cost estimates reach the lower brackets, however, financing becomes practically impossible. There is no doubt in the minds of men in the gas utility industry that eventually the New York, Philadelphia and Boston markets will be tapped, but guesses as to how soon range from the near future to the indefinite future.

One of the most important factors in considering introduction of natural gas to the eastern seaboard is the cost of converting manufactured gas distribution and consumer facilities to those suitable for the natural product. The task of distributing natural gas in New York, for example, would

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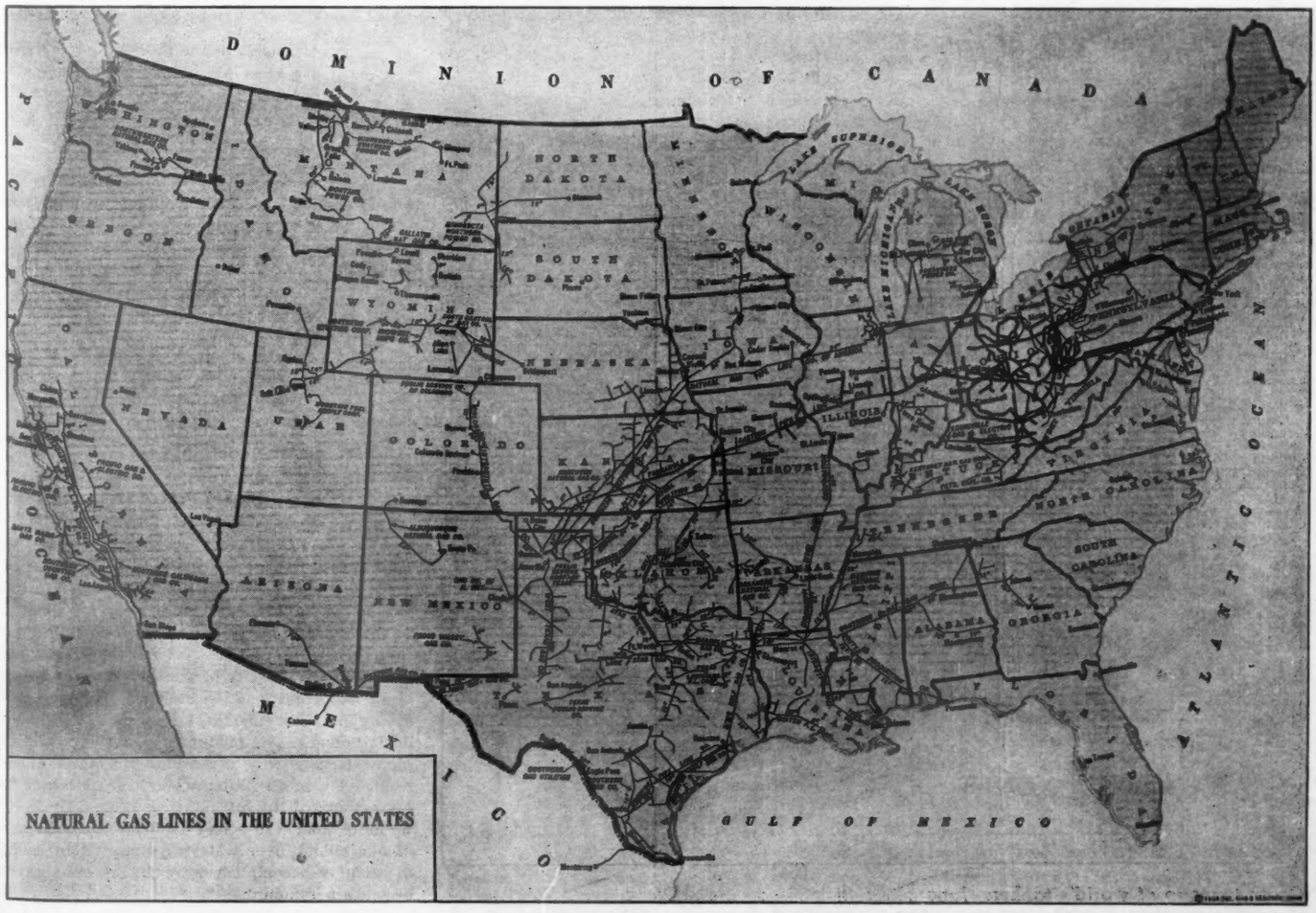


Four tankers at Phi ladelp

OCEAN TANKERS, I

SUPPLEMENT P

By H. Stanley Norman

NEW YORK, Sept. 19.—Of the world's total of 1,655 tankers of 1,000 gross tons and upward the United States leads all nations. Tankers of American registry total 418 with 2,759,642 gross tons as of June 30, 1938, according to Lloyd's Register. The vessels and tonnage did not include craft of less than 1,000 gross tons and therefore do not cover the capacity of a big majority of American oil barges and river boats. Likewise, American oil companies with international operations such as Standard Oil of New Jersey, Socony-Vacuum Oil Co., Texas Co., California-Texas Oil Co. and others are extensive owners of tankers flying flags of other countries.

American companies operating in Germany, for example, have ordered tankers liberally from Reich shipyards, partially at least because of their inability to realize profits from business there in a more suitable form. Furthermore, the trade requirements are frequently a determining factor in deciding what country shall build a particular boat for which need arises.

Excepting for the trend toward larger, faster vessels and more comfortable accommodations for officers and crews, the pattern of American built tankers has varied widely with each new order. Naval architects say this variety of demands by tanker purchasers and operators is one of the important reasons why American tank ship costs are so much greater than in England and Germany and other foreign shipyards. Other contributory factors are higher wage scales prevailing in this country, the degree of accommodation demanded in officers and crew quarters and the generally more expensive type of auxiliary equipment incorporated into American-built vessels.

Speed and Economy

The search for speed and economy in tankship operation is directly responsible for the introduction of welding in the larger vessels. Some builders have adopted electric welding only so far as the interior bracing is concerned, retaining the riveted shell and deck plating.

Although one of the first all electrically-welded self-propelled vessels to be built in this country, the White Flash, a vessel 201 feet 2 inches long overall, 34 feet beam and 12 feet molded depth with a capacity of 7,500 bbls. of oil, was delivered in 1931, it was not until 1936 that the same construction method was applied to the larger type of ocean and coastwise vessel. In 1936 Atlantic Refining Co. placed with Sun Shipbuilding & Dry Dock Co. an order for a tanker 521 feet long, 70 feet beam and 40 feet depth of 18,500 tons deadweight, in which the entire tank space extending from the engine room bulkhead to the forward end of the tank space for a length of 353 feet was completely of welded construction. Atlantic ordered a sister tanker which was delivered this month and Sun Oil Co. has a similar vessel in service making a total of three tankers of over 18,000 tons deadweight with the tank spaces completely welded.

In addition to the saving in weight accomplished by welding, it is the consensus of ship builders and owners that the smooth plates will offer less opportunity for surface corrosion and the interiors of tanks are said to be most easily cleaned.

The degree to which weight-saving has gripped ship builders and ship owners is best exemplified by the fact that hatch covers are now being made from cast aluminum; the eyes above deck for mooring are hollow steel welded to the deck instead of the former solid cast members. Window framing, paneling, bunks, auxiliary hoists, pumps, etc., have not escaped the engineers' attention in their zeal to cut down weight without sacrificing strength or efficiency. In many cases the reduction of weight has added not only to the efficiency of the propelling machinery, but has made operation of tankers easier. One man can handle the hatch covers made of cast aluminum in the newer tanker, whereas machinery or several seamen were required to place and remove the old type made of cast steel. Outside of the propelling machinery, the expensive steel alloys have found no place in tanker construction. The loss from corrosion in hulls and decks is not sufficient to justify the adoption of alloys in the enormous amount of steel plating going into a tanker.

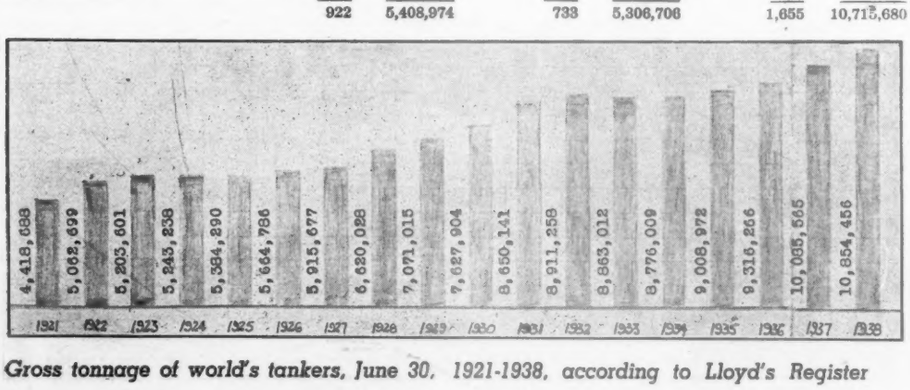
Motor ships—that is tankers powered with Diesel engines—are more popular in other parts of the world than in the American yards. This is due to the lower specific fuel consumption accomplished by Diesel-powered units which is especially important in long trans-oceanic voyages. Since a good part of the foreign tanker construction is for the longer trade routes, the popularity of Diesel power over steam is more pronounced than in American construction. American built boats are generally intended for coastwise or intercoastal service over routes usually no more than a third as long as those traveled by European boats.

Diesel Power

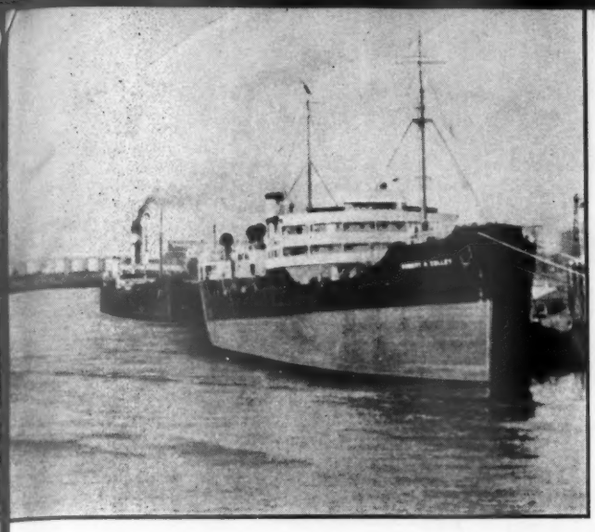
In general, Diesel-powered tankers consume .35 to .4 pounds of fuel per horsepower per hour. The most efficient steam units developed by American naval engineers, the double reduction geared turbine sets or the turbo-electric types, consume about .65 to .7 pounds of fuel per horsepower per hour. From these general figures it is evident the greater payload carrying capacity of the Diesel-powered boats is an important consideration on long trips. The saving in weight is no less important in the shallow draft tankers used on inland waterways and explains largely why motorships are used almost exclusively in the latter water transportation requirements of the oil industry. With channels of no more than 6 to 9 feet available through parts of our inland river waterways any slight saving in weights accomplished by Diesel installations becomes paramount.

LLOYD'S REGISTER BOOK TOTALS OF WORLD TANKER REGISTRATIONS, 1,000 TONS GROSS AND UPWARDS
1938-39

Countries where owned—	Steamers No.	Steamers Tons	Motorships No.	Motorships Tons	Total No.	Total Tons
America (U. S.)	349	2,400,239	69	359,403	418	2,759,642
Great Britain and Ireland	224	1,231,937	186	1,440,282	410	2,672,219
Norway	55	386,573	207	1,585,896	262	1,972,469
Holland	47	150,172	65	411,774	112	561,946
Panama	8	62,089	41	388,172	49	450,261
Italy	64	298,514	14	81,974	78	380,488
Japan	12	106,534	27	239,315	39	345,849
France	30	164,105	10	77,791	40	241,896
Other British Dominions, Colonies, etc.	26	185,948	6	30,793	32	216,741
Germany	12	91,918	19	110,303	31	202,221
Sweden	..	..	17	144,899	17	144,899
Canada	19	41,164	9	83,563	28	124,727
Russia (Soviet Union)	3	7,898	24	115,311	27	123,209
Denmark	2	9,670	12	97,116	14	106,786
Spain	6	20,812	10	56,113	16	76,925
Belgium	..	..	9	64,923	9	64,923
Other countries	65	251,401	8	19,078	73	270,479
	922	5,408,974	733	5,306,706	1,655	10,715,680



Gross tonnage of world's tankers, June 30, 1921-1938, according to Lloyd's Register



ladelphia terminals

S, INLAND BARGES, IT PIPE LINES

22 years old. Only 12 per cent of the total is more than 20 years old, but 80 per cent is more than 15 and less than 20 years old. A total of 1,948,630 gross tons of the American tank fleet is more than 12 years old. Basing the average economical life of a tankship on the generally accepted figure of 20 years, about 1,320,000 gross tons of replacements will be required to maintain the present age level over the next five years. This represents an average of about 264,000 gross tons per year.

At the present time the price per ton for 13-knot tank steamers is fairly well established at $140. Total cost of the 12 navy-type tankers is at the rate of $191.50 per ton deadweight, but with the Government's participation the cost to the companies is roughly $138 per ton, which is in line with the current prices for 13-knot tankers. It is reasonable to assume that the Government's share in the cost includes some consideration for speed, thus making tankers capable of keeping up with the fleet. The trend to speedier tankers poses the question whether the present tank fleet is adequate to take care of American petroleum water transportation requirements. Despite the fact that production and consumption have moved steadily upward in recent years, it is possible that the gross tonnage of the American fleet will not require material extension for the next few years.

It is estimated that fully 75 per cent of the nation's oil production is transported by water at some stage of its movement from wells to consumption. Bays and inlets along both the Atlantic and Pacific coasts are served exclusively by water. From the major ocean terminals along both coasts, it is estimated that 30,000 to 45,000 miles of inland waterways are available for movement of petroleum through a wide portion of the territory east of the Mississippi and to a smaller extent on the Pacific coast. The less expensive means of transporting petroleum by water is being adopted in the industry as rapidly as new markets are made available or as soon as the volume requirements justify addition of facilities.

Gross Tonnage

The following table shows the number and gross tonnage of steamers and motorships, each of 1,000 tons and above, intended to carry oil in bulk, under construction in the world at the end of June, 1938, reported by Lloyd's Register:

Country of build—	Steam		Motor		Total	
	No.	Tons	No.	Tons	No.	Tons
British Dominions	..	....	2	3,700	2	3,700
Danzig	2	13,000	..	....	2	13,000
Denmark	..	....	4	37,550	4	37,550
France	1	1,600	2	15,400	3	17,000
Germany	3	24,500	13	130,650	16	155,150
Great Britian and Ireland	1	5,000	34	286,842	35	291,842
Holland	..	....	15	116,220	15	116,220
Italy	2	8,800	9	73,850	11	82,650
Japan	1	19,625	4	41,000	5	60,625
*Spain	..	....	3	20,220	3	20,220
Sweden	..	....	5	43,975	5	43,975
United States	8	70,228	2	14,350	10	84,578
Total	18	142,753	93	783,757	111	926,510

*Complete information not available.

Greatest interest in current tanker construction centers around the 12 high speed ships being constructed by Standard Oil Co. of New Jersey and Keystone Tankship Corp. in cooperation with the Navy and Marine Commission. The dozen boats will be the fastest in the American tanker fleet and will be among the largest oil transports in service. Each of the 12 boats will be 525 feet in length, 75 feet beam and 39 feet in depth. They will draw 30 feet of water loaded and have deadweight of 16,300 tons.

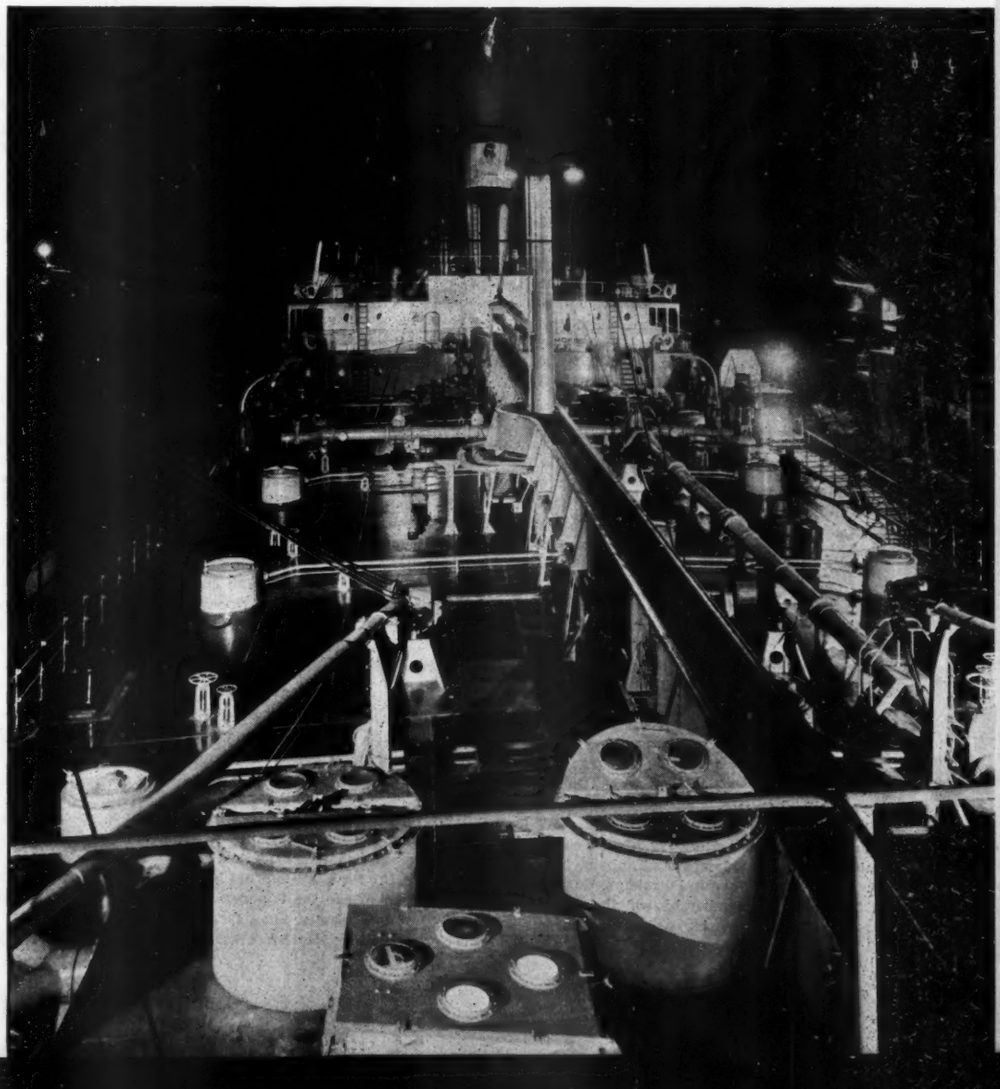
Navy Tenders

The vessels will have top speed of 18 knots, but are designed to cruise at 16½ knots with the propeller turning at 85 r.p.m. The double reduction gear steam turbine power unit will deliver 12,800 s.h.p. Electric welding is to be used throughout the boats, except in the hull and deck-plating which will be riveted, thus speeding construction. Bulbous bows are specific for each of the new navy-type boats, a design not commonly used in tanker construction. Intended as Navy tenders in emergency, the 12 tankers now under construction at four yards, are to be equipped with gun mountings and with advanced radio facilities and navigation aids.

Equipped with defense facilities, each of the 12 tankers will cost $3,129,667 or a total of $37,556,004. The Government is paying $10,563,000 of the total cost and has the privilege of requisitioning the boats at any time by paying the oil companies outright at a depreciated scale. The oil companies agree to maintain the ships in operating condition for the next 20 years under the American flag.

This development between Standard of New Jersey and the Maritime Commission brings up the question of American tank fleet age and prospects for new construction in the near future. United States Department of Commerce reports indicate there are now about 330 American tankers, of 2,383,540 gross tons, which are not more than

Night view of S. S. J. W. Van Dyke looking aft from bridge



Price Revision on Smackover Regarded as Adjustment

SHREVEPORT, La.—The price-cut of Smackover, Arkansas, crude posted on September 15, at 7 a.m. by Standard Oil Co. of Louisiana, has been met by all other purchasers. The cut, from 90 cents to 75 cents per barrel, was regarded by Standard as an adjustment which would not necessarily be reflected in other fields. It was stated that in view of prices paid for other regional crudes, the Smackover price was relatively high. Schuler crude sells for 90 cents, but it is of 35 gravity, while Smackover averages 26 to 28 gravity for the light grade, and 19 to 20 gravity for heavy, the latter comprising about 90 per cent of production.

Smackover crude is of inferior quality from the refiner's standpoint, compared with some other North Louisiana and Arkansas production. The light grade, varying from 26 to 28 gravity, shows a straightrun gasoline yield of 13 per cent, kerosene 5 per cent, cracked gasoline 33 per cent, fuel oil 44 per cent and gas and loss 5 per cent. Heavy Smackover, the predominant grade, yields 7 per cent straightrun gasoline, no kerosene, cracked gasoline 37 per cent, fuel oil 52 per cent and gas and loss 4 per cent. Straightrun gasoline needs sweetening, and cracked gasoline requires considerable treating, averaging from .2 to .3 per cent sulfur.

August deliveries by pipe line were as follows:

Henry H. Cross to Henry H. Cross refinery, light	6,399
Henry H. Cross to Henry H. Cross refinery, heavy	74,967
Gulf Oil Corp. to Standard Oil Co. of Louisiana, heavy	61,456
Hollyfield & McFarlane to Macmillan Petroleum Corp., heavy	78,873
Standish Pipe Line Co. to H. H. Cross, heavy	22,760
Standish Pipe Line Co. to Macmillan, heavy	22,907
Woodley Petroleum Corp to Macmillan, heavy	7,357

Oil moved by pipe line during August was as follows:

Arkansas Fuel Oil Co., light	38,419
Lion Oil Refining Co., heavy	126,176
Magnolia Pipe Line Co., light	10,196
Magnolia Pipe Line Co., heavy	8,918
Standard Pipe Line Co. (to Mississippi), heavy	138,436
Texas Pipe Line Co., heavy	27,470

Tankcar shipments out consisted of 34,342 bbls. moved by Macmillan Petroleum Corp.

Distribution of the crude among the gathering systems was as follows:

Heavy—	
Standard Oil of Louisiana:	
Own production	73,634
Other production	22,214
Cross::	
Own production	437
Other production	56,965
Gulf:	
Own production	61,441
Other production	415
Hollyfield & McFarlane:	
Own production	18,204
Other production	none
Lion Oil Refining Co.:	
Own production	42,726
Other production	76,407
Macmillan Petroleum Corp.:	
Other production	36,461
Magnolia Petroleum Co.:	
Own production	8,919
Standish Pipe Line Co.:	
Own production (Phillips)	60,929
Texas Pipe Line Co.:	
Own production (Texas Co.)	26,281
Woodley Petroleum Corp.:	
Own production	7,358
Light—	
Standard Oil Co.:	
Other production	1,203
Arkansas Fuel Oil Co.:	
Own production	7,991
Other production	27,029
Cross:	
Other production	3,712
Gulf:	
Own production	9,903
Other production	340
Magnolia:	
Own production	10,196

Arkansas Fuel Oil Co. delivered to treating plant and ran to pipe line 1,652 bbls. of light crude, its own production.

New A.P.I. Public Relations Body Headed by Rodgers

W. S. S. Rodgers, president of Texas Co., has been named chairman of the American Petroleum Institute's new committee on public relations by President Axtell J. Byles.

Mr. Rodgers will serve also as chairman of the Public Relations Steering Committee, the first of a number of sub-committees to be appointed from membership in the general committee and from branches of the industry. The new committee, which comprises 27 members and is to be enlarged, replaces the Public Relations Advisory Committee.

The first meeting of the committee on public relations will be held Monday, September 26, in the Stevens Hotel at Chicago. Members so far appointed are:

Paul V. Barrett, Ohio Oil Co.; Paul G. Blazer, Ashland Refining Co.; Ralph C. Champlin, Ethyl Gasoline Corp.; James A. Dunn, Barnsdall Oil Co.; W. R. Francisco, Deep Rock Oil Corp.; A. C. Galbraith, Union Oil Co.; W. Grant, Pennzoil Co.; Eben Griffiths, Socony-Vacuum Oil Co., Inc.; Walter R. Haun, Lion Oil Refining Co.; C. L. Henderson, Vickers Petroleum Co.; C. C. Herndon, Skelly Oil Co.; Allen Jackson, Standard Oil Co. of Indiana; Francis L. Jehle, Globe Oil & Refining Co.; Roy B. Jones, Panhandle Producing & Refining Co.; R. C. Jopling, Phillips Petroleum Co.; E. B. Lyman, Standard Oil Co. of New Jersey; Ray E. Miller, Hanlon-Buchanan, Inc.; George D. Olds, Continental Oil Co.; H. F. Parsons, Tide Water Associated Oil Co.; Philip Patchin, Standard Oil Co. of California; T. D. Peace, Shell Union Oil Corp.; D. T. Pierce, Consolidated Oil Corp.; Richard Rollins, Atlantic Refining Co.; Paul Ryan, Pure Oil Co.; H. A. Schramm, Kanotex Refining Co.; George H. Shaw, Cities Service Co.; James A. Tanham, Texas Co., and W. K. Warren, Warren Petroleum Co.

The present membership of the Public Relations Steering Committee is: Northrop Clarey, Standard Oil Co. of New Jersey; E. W. Hodges, Cities Service Oil Co.; T. D. Peace, Shell Union Oil Corp.; D. T. Pierce, Consolidated Oil Co.; Conger Reynolds, Standard Oil Co. of Indiana, and J. C. Welliver, Sun Oil Co.

Victor H. Scales has been appointed secretary.

National Safety Councils To Hold Silver Jubilee

More than 10,000 men and women from all over the world will assemble in the Stevens Hotel October 10-14 as delegates to the National Safety Councils' Silver Jubilee Safety Congress and Exposition.

The 1937-38 officers of the petroleum section are: General chairman, H. W. Boggess, Sinclair Prairie Oil Co.; vice chairman, J. H. Brown, Tide Water Associated Oil Co.; program chairman, A. W. Breeland, Lone Star Gas Co.; secretary, H. N. Blakeslee, American Petroleum Institute; chairman Atlantic division, L. C. Woodbridge, Socony-Vacuum Oil Co., Inc.; chairman Mid-Continent division, J. D. McCamay, Jr., Carter Oil Co.; chairman Rocky Mountain division, R. O. Traylor, Standard Oil Co. (Indiana); chairman Gulf division, William Grant, Jr., Humble Oil & Refining Co.; chairman Pacific division, C. J. Nobmann, Shell Oil Co.; chairman Great Lakes division, R. T. Henderson, Standard Oil Co. of Ohio.

The program follows:

MONDAY, OCTOBER 10

2:00—Report of general chairman. R. W. Boggess.

2:15—Welcoming address. Dr. M. R. Schmidt, assistant general supterintendent, Whiting Refinery, Standard Oil Co. (Indiana), Whiting, Ind.

2:45—Training for safety.

(a) A Company Training Program as an Aid in Accident Prevention. Capt. A. A. Nicholson, manager personnel department, Texas Co.

(b) Presentation of Accident Prevention Training Problems to the Supervisory Groups. H. E. Dischinger, safety engineer, Shell Petroleum Corp.

(c) Presentation of Accident Prevention Training Problems to Employe Groups. G. O. Lockwood, safety director, Cities Service Oils.

4:00—U. S. Bureau of Mines Course on Gas Hazards. G. M. Kintz, assistant district engineer, U. S. Bureau of Mines.

TUESDAY, OCTOBER 11

2:00—How Accident Prevention Programs Can Be Developed to Reach Small Producers, Jobbers, and Dealers.

(a) The Need of Spreading Information on Safety Throughout Small Units of the Industry. F. R. McLean, manager safety and insurance department, White Star division, Socony-Vacuum Oil Co., Detroit.

(b) Interesting the Independent Driller and Producer. John E. Mitchell, district engineer, Hartford Accident & Indemnity Co.

3:15—Welding Processes Employed in Pipe Line and Tank Construction. W. B. Browning, process service engineer, Linde Air Products Co.

4:00—Design, Construction, and Maintenance of Crude-Cracking Combination Units. C. W. Nofsinger, M. W. Kellogg Co.

4:45—Election of officers.

WEDNESDAY, OCTOBER 12

2:00—Opportunities and Responsibilities of the Safety Man. Roy C. Coffee, general counsel, Lone Star Gas System.

2:30—Cooperating With Local Fire Departments. C. J. Nobmann, manager safety department, Shell Oil Co.

3:00—"The Safety Chek." A natural-color motion picture covering accident prevention and safe practices in service station operation. A. L. Anderson, safety engineer, Standard Oil Co. of California.

3:45—Inspection, Maintenance, and Safe Use of Pumping Derricks. James E. Dyer, assistant safety director, Sun Oil Co.

THURSDAY, OCTOBER 13

12:30—Luncheon. H. W. Boggess, general chairman, presiding.

The Value and Use of Statistics in Accident Prevention Work. Hadly H. Myers, safety engineer, Sinclair Prairie Oil Co.

Petroleum Industry's Contribution to Safety in America. J. I. Banash, consulting engineer, Chicago, and past president, N.S.C.

2:30—Round table discussion.

Texas Attorney General Says Oil Bid Too Low

AUSTIN, Tex.—Attorney General William McCraw announced Friday that confiscated East Texas hot oil will not be sold at 30 cents a barrel, as bid for 122,000 bbls. at Henderson by the sheriff at auction sale "because the price is totally inadequate as the oil is worth between 80 and 90 cents a barrel."

Mr. McCraw said he would move to set aside the purported sale and that he was withdrawing 82,000 bbls. to have been sold at Tyler.

There were three bidders at Henderson, J. D. Warther, Marvin McMurray, and W. R. Skeen, and the offers were 20 cents, 22 cents, and 30 cents per barrel. All the oil is 34 gravity. Mr. Skeen was the highest bidder.

Texaco Purchasing Kansas Outlets From Shell

NEW YORK, Sept. 15.—Texas Corp. announced today it was completing the purchase of 21 Kansas outlets from Shell Petroleum Corp.

The properties involved consist of six bulk stations to handle wholesale business and about 15 retail service stations.

Some of the cities involved: Arkansas City, Chanute, Humboldt, Ottawa, Paola, Parsons, and Yates Center.

C. L. McMahon Buys East Texas Wells From Canadian Company

Charles L. McMahon, Inc., of Tulsa, already owner of 73 East Texas producing wells, has purchased from the Canadian Producing Co. a 40-acre lease on which are seven producing wells. The purchase price is given as $262,500.

the OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

Published weekly by The Petroleum Publishing Company at Tulsa, Oklahoma

Clinching the Case

In a year which has seen contraction in many forms of transportation the pipe line industry has continued to expand and maintain its existing facilities with a view of giving maximum service to its customers at the lowest possible cost.

As revealed in the numerous discussions appearing in this Annual Pipe Line Number of The Oil and Gas Journal, operators of pipe lines have gone forward in all branches of their activities. They have built lines into new fields. They have reconditioned and enlarged lines that have been in operation for many years. Trunk lines have been built for the increasingly important gasoline division which is now beginning to resemble the natural gas system in connecting sources of supply with consuming centers.

In the technical end operators are keeping pace with the closely allied producing and refining branches in devising means to construct and operate more efficiently.

Are these accomplishments not the answer of the pipe line industry to those who continue to seek the separation of these transportation facilities as an integral part of the oil industry?

While other transportation agencies have either bogged down or are constantly clamoring for special concessions or other subsidies at Washington, the pipe line industry, relying entirely upon its own resources, has continued to grow and serve the field for which it was intended.

Unquestionably, this could not have been accomplished had it been divorced from the rest of the oil industry and forced to carry on without the cooperative aid it has enjoyed from the other divisions of the industry.

In this connection it is pertinent to refer to the conclusions reached by Dr. Splawn who contributes the opening article in this issue. In his widely quoted report as special counsel for the House Committee on Interstate and Foreign Commerce of its investigation of pipe lines, Dr. Splawn concluded:

"Oil pipe lines are found as a result of this investigation to be plant facilities in an integrated industry. They are very different from railroads in that railroads carry all manner of freight, whereas pipe lines are limited to one product: petroleum carried in one direction from a diminishing source of supply. It appears very difficult to apply the 'commodities clause' to oil pipe lines. If the oil companies were forced to sell the pipe line companies, who would buy them and who would build to newly discovered fields?"

The pipe line, as a transportation medium, is irrevocably linked with producing, refining and marketing. Owing to the rapid changes in the location and volume of supply, the pipe line investment cannot economically stand alone. The risk must be distributed to all phases of the industry if capital is to survive.

So far as consumers are concerned one of the principal reasons that petroleum products are cheap is the ability of the industry constantly to expand and improve its pipe line transportation.

The railroad is economically constructed to serve a growing demand whereas the pipe line requires its maximum investment at the beginning and serves thereafter a declining service demand.

The coming session of Congress will have enough to do in taking care of those transportation agencies which come for help on crutches and should not concern itself with the virile industry which, in bad times as well as good times, is able to keep its house in order and meet the requirements of those it serves and those employed by it.

Programs and Meetings

Committees Appointed for Next Houston Oil Show

Plans for the 1939 oil show at Houston have been further advanced by the recent appointment of committees to handle the various departmental activities which have become important features of the Oil-World Exposition. Although the next exposition will not be held until April 24-29, 1939, Ed Lenzner, general manager of the Oil-World Exposition, advises that the actual work of the various committees will be started at once so complete plans of each can be made well in advance and the work of the different departments coordinated most effectively.

The General Program Committee chairman is Joe Russell of Gulf Oil Corp. and the Drilling and Production Committee chairman is George Coriess of Humble Oil & Refining Co. Ed Lenzner will serve as assistant chairman of both and the chairman of each will appoint necessary members to carry on the work.

The other committees are: Refinery Committee with W. H. Curtin of W. H. Curtin & Co., chairman; Ed Lenzner, assistant chairman; O. E. Berg, Babcock & Wilcox Tube Co.; M. N. Dannenbaum, M. N. Dannenbaum Co.; R. L. Mallory, Brown Instrument Co.; Joe Miller, Humble Oil & Refining Co.; Joe Peddle, Maintenance Engineering Corp.; George Reid, editor, the Refiner; J. L. Finley, Humble Oil & Refining Co.; L. G. Marsh, Taylor Instrument Co.; G. B. Lane, Foxboro Co.; H. M. Stewart, Humble Oil & Refining Co.

Conference on Refinery Laboratory Procedures: K. H. Clough, W. H. Curtin & Co., sub-chairman; Dr. F. W. Jessen, Humble Oil & Refining Co.; Fred W. Karl, Gulf Oil Corp.; R. C. Rich, Shell Petroleum Corp.; A. R. Rickards, Sinclair Refining Co.; E. W. Gardner, Texas Co.; W. F. Fulton, United Gas Co.

Petroleum Safety Committee: J. J. Delahide, B. F. McDonald Co., chairman; Ed Lenzner, assistant chairman; R. B. Roaper, Humble Oil & Refining Co.; C. A. Miller, Texas Co.; C. L. Hightower, United Gas System; P. E. Keegan, Shell Petroleum Corp.; F. P. Werner, American Petroleum Co.; Lee Conners, Texas Co.; H. L. Rankin, Gulf Oil Corp.; George Gruber, Mine Safety Appliances Co.; R. H. Horde, Shell Petroleum Corp.; T. S. Maffitt, Houston Oil Co.; William Grant, Humble Oil & Refining Co.; Claude Lilles, Magnolia Petroleum Co.; C. W. Coleman, Gulf Refining Co.; Bob Cox, American Optical Co.; Don Cross, Accident Prevention Co.; J. L. Manes, Sun Oil Co.; J. L. Risinger, Magnolia Petroleum Co.; E. W. Breeland, Lone Star Gas Co.; H. B. Williams, Pan American Petroleum Co.; Bob Skelton, American Red Cross; G. M. Kintz, engineer, U. S. Bureau of Mines.

JOE H. RUSSELL

Entertainment Committee and Oil Men's Banquet Committee: Frank Carothers, Norvell-Wilder Supply Co., chairman; Ed Lenzner, assistant chairman; T. L. Fontaine, Humble Oil & Refining Co.; O. S. Cummings, Houston Oil Co.; S. T. Childress, Rio Bravo Oil Co.; Robert J. Miller, Robert J. Miller Co.; George O'Leary, Houston Oilfield Material Co.

Foreign Dinner Committee: R. L. Dudley, Gulf Publishing Co., chairman; Ed Lenzner, assistant chairman. Other members will be appointed later.

Transport Committee: Motor Transportation Division of oil companies will have the following members: Leo New, United Gas System, chairman; E. B. Tilley, Gulf Oil Corp., vice chairman; Oscar Lynch, Humble Oil & Refining Co.; Jack Parker, Transportation Equipment Co.; T. G. Price, Shell Petroleum Corp.; Frank Nolan, Texas Co.; Alex Muncie, Pure Oil Co.; Lonnie Smith, Sun Oil Co.

All other committees such as: Export Committee; California Association Committee; Rocky Mountain Association Committee; Attendance Committee will be appointed at a subsequent meeting.

East Texas A.P.I. Chapter to Discuss Pumping Problem

KILGORE, Tex.—Byron Meredith, division superintendent of Sinclair Prairie Oil Co., announces that the fall meeting of the East Texas Chapter of the American Petroleum Institute Division of Production will be held in the high school auditorium at Kilgore, Tex., Tuesday evening, October 11. Mr. Meredith, who is chairman of the chapter, also announced that a special program dealing with pumping problems in the East Texas field would be presented. The pumping problem is very acute due to the declining pressure of the field to the critical point where artificial lift is necessary.

There will be a dinner prior to the meeting beginning at 6:15 p.m. at the Kilgore Hotel.

I.P.A.A. Tulsa Meeting Most Important in Its History

Oil men from every part of the country are preparing for the most important meeting of the Independent Petroleum Association of America in its history, to be held in Tulsa October 19, 20, and 21, and will formulate long-range policy touching every phase of the industry, according to President Charles F. Roeser, of Fort Worth, Tex.

Among issues to be discussed will be protection of the domestic producers; limitation on imports of crude and refined products, renewal and strengthening of the Interstate Oil Compact, and taxation.

W. G. Skelly, president of Skelly Oil Co., is serving as chairman of the general committee on arrangements.

CALENDAR

September

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, midyear meeting, under direction of West Texas Geological Society, El Paso, Tex., Sept. 27-Oct. 2.

INTERSTATE OIL COMPACT COMMISSION, quarterly meeting, Tulsa, Sept. 29.

October

NATIONAL LUBRICATING GREASE INSTITUTE, Chicago, Oct. 3-4.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Petroleum Division, San Antonio, Tex., Oct. 5-7.

SOCIETY OF AUTOMOTIVE ENGINEERS, National Regional Fuels and Lubricants meeting, Tulsa, Oct. 6-7.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Minerals Division, Knoxville, Tenn., Oct. 6-8.

NATIONAL BITUMINOUS CONFERENCE, sponsored by W.P.R.A. and Montana and Mississippi Highway Departments, Biloxi, Miss., Edgewater Beach Hotel, Oct. 10-13.

AMERICAN GAS ASSOCIATION, Atlantic City, N. J., Oct. 10-14.

NORTH AMERICAN GASOLINE TAX CONFERENCE, Tulsa, Oct. 10-14.

NATIONAL SAFETY CONGRESS, Chicago, Stevens Hotel, Oct. 10-14.

SOCIETY OF AUTOMOTIVE ENGINEERS, Aircraft Production meeting, Los Angeles, Ambassador Hotel, Oct. 13-15.

NATIONAL STRIPPER WELL ASSOCIATION, Tulsa, Oct. 18.

INDEPENDENT PETROLEUM ASSOCIATION, Tulsa, Oct. 19-21.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Minerals and Petroleum Divisions, Los Angeles, Oct. 20-21.

NATIONAL ASSOCIATION OF CREDIT MEN, Petroleum Refiners Division, Indianapolis, Ind., Oct. 24-26.

NATIONAL PETROLEUM ASSOCIATION, Department of Fire and Accident Prevention, Olean, N. Y., Oct. 26.

MID-CONTINENT OIL AND GAS ASSOCIATION, Texas Division, San Antonio, Oct. 27-29.

November

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, regional meeting, Tucson, Ariz., Nov. 1-5.

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, Pacific Section, Los Angeles, Nov. 3-4.

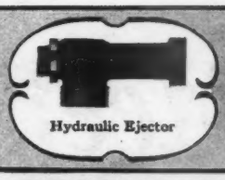
AMERICAN PETROLEUM INSTITUTE, annual meeting, Chicago, Stevens Hotel, Nov. 14-18.

December

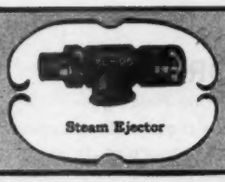
AMERICAN SOCIETY OF MECHANICAL ENGINEERS, New York, Dec. 5-9.

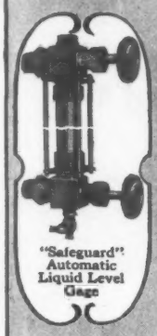
March, 1939

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, annual meeting, Oklahoma City, Okla., March 22-24.


Hydraulic Ejector

PENBERTHY PRODUCTS


Steam Ejector

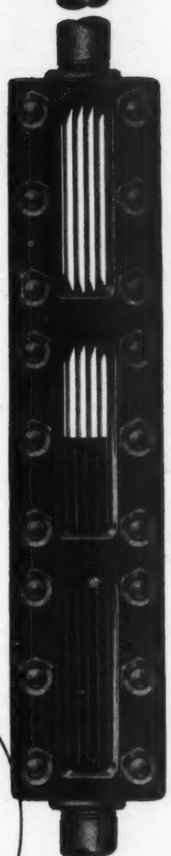

"Safeguard" Automatic Liquid Level Gage

Automatic Injector

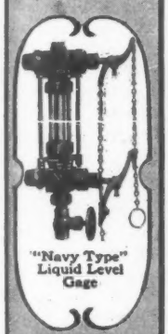
PENBERTHY *Reflex Gages*

(Licensed under Jerguson Patent)

have many refinery and natural gasoline plant applications



MULTIPLE TYPE EQUIPPED WITH DROP FORGED STEEL GAGE VALVES


"Navy Type" Liquid Level Gage

Gas Engine Lubricator

VAPOR RECOVERY

ACCUMULATOR TANK

● The sketches show only a few of the many important applications for Penberthy Reflex Gages in oil refineries and natural gasoline plants. As a matter of fact, Penberthy Reflex Gages are preferred wherever a liquid level must be easily and positively visible . . . when that liquid is under pressure or at high temperature (or both).

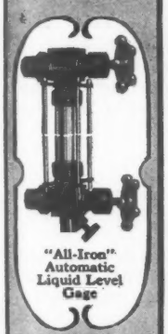
Penberthy Reflex Gages are of exceptionally rugged construction; they are made in any length desired and for various kinds of liquids. We shall be glad to quote upon your requirements.

EMPTY SPACE SHOWS WHITE

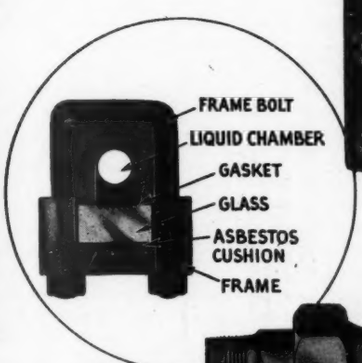
LIQUID SHOWS BLACK

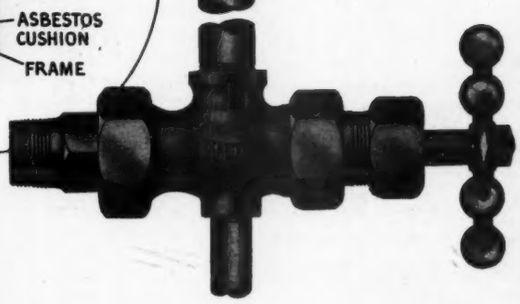
REBOILER

PENBERTHY PRODUCTS


"All-Iron" Automatic Liquid Level Gage

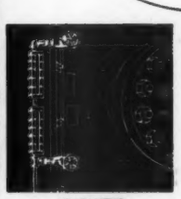
Snap Lever Oiler





VAPOR SEPARATOR

CRACKING STILL


STABILIZER

Automatic Cellar Drainer (Water or Steam Operated)

Automatic Electric Sump Pump

PENBERTHY INJECTOR COMPANY Manufacturers of QUALITY PRODUCTS Since 1886
DETROIT, MICH. • Canadian Plant, Windsor, Ont.

Spring Compression Grease Cup

Plain Compression Grease Cup

Screw Plunger Grease Cup

TRANSPORTATION

(Continued from Page 55)

the field notes, prepared by the pipe line companies, as rapidly as the work was completed. In many instances the state commissions also participated in the work and they will unitize the results attained from this valuation in connection with local control.

The commission's forces at Washington are now busily engaged in collecting the information gathered in the field, and to date 28 tentative valuations and 13 final reports showing the value of individual pipe line companies have been issued. Underlying engineering, accounting and land reports have been served on a number of other companies—a preliminary to the preparation of tentative valuations. These are also served on the states. Tentative valuations, as provided by law, are issued and 30 days allowed for protest by the companies, the states and the public. If protest by any party is made, hearing is held; otherwise the tentative valuation becomes final. To assist it in its duties, the commission has collected cost data on all major construction jobs performed in the past years and will continue to keep these valuable data up to date by obtaining similar costs yearly. Also, studies have been made towards depletion of oil fields, life of pipe, corrosion, erosion, and soil classification.

Section 19a of the Interstate Commerce Act, under which these valuations have been prepared, provides that upon completion of the original valuation the commission shall thereafter keep itself informed of all new construction, extensions, retirements, or other changes in the condition, quantity, use, and classification of the property. Pursuant to this provision of the act, orders have been issued requiring that all changes in the property subsequent to date of valuation be reported to the commission. Many of these reports for the years 1935, 1936, and 1937 have been received so that information is available for making the valuation current.

For the year 1937, the Interstate Commerce Commission received 59 annual reports from pipe line companies. This may be contrasted with the 33 reports received for 1927, 10 years earlier. The reports for 1937 show the following results:

TABLE 4

Item—	1937	1936
Miles of line operated:		
Gathering lines	39,800	39,600
Trunk lines	56,811	54,460
Investment in carrier property	$802,945,910	$773,742,828
Operating revenues	$247,105,701	$219,057,109
Operating expenses	$ 99,641,086	$ 92,898,880
Pipe line taxes	$ 38,562,724	$ 31,667,436
Net income	$102,796,361	$ 91,741,892
Dividend appropriations	$ 75,829,332	$ 75,847,347
Oil transported (barrels):		
Originated	948,348,325	806,600,125
Received from connecting lines	340,071,608	295,116,780
No. of bbl.-miles (trunk lines):		
Crude oil (thousands)	279,212,919	(*)
Refined oil (thousands)	22,346,832	(*)
Employes:		
Average number	24,392	23,235
Compensation	$ 45,054,857	$ 38,248,175

*1936 barrel-miles not comparable with 1937.

TABLE 2—STATISTICS OF INTERSTATE PIPE LINE COMPANIES

(Both crude oil and gasoline)

Year—	No. of companies at close of year	Miles of line operated— Gathering lines	Trunk lines	Total all lines	Investment in carrier property-carriers' book	Oil and gasoline transported (barrels)
1918*	32	23,415	22,157	45,572	$235,995,970	563,747,646
1919	32	24,867	24,435	49,302	288,499,726	581,781,482
1920	32	27,663	25,330	52,993	340,323,150	533,180,014
1921	33	29,325	25,935	55,260	365,024,499	525,516,248
1922	36	30,900	26,449	57,349	382,279,598	651,250,632
1923	35	31,621	33,139	64,760	432,065,360	658,396,521
1924	36	34,422	33,763	68,185	496,187,164	757,677,907
1925	37	35,241	34,768	70,009	511,087,922	831,199,821
1926	34	37,749	35,097	72,846	539,409,607	835,582,970
1927	33	38,685	37,385	76,070	609,438,885	989,427,028
1928	33	40,685	39,423	80,108	659,092,738	1,053,190,757
1929	37	41,489	44,307	85,796	741,010,196	1,156,350,772
1930	40	42,806	45,922	88,728	772,710,908	1,172,165,080
1931	51	41,803	51,287	93,090	845,049,923	986,953,284
1932	49	41,378	51,404	92,782	763,941,669	1,120,848,200
1933	49	40,859	52,865	93,724	766,251,456	1,189,086,224
1934	53	39,665	53,405	93,070	758,171,930	1,213,652,108
1935	53	39,380	52,657	92,037	763,009,274	1,058,840,489
1936	52	39,600	54,460	94,060	773,742,828	1,101,716,905
1937†	59	39,800	56,811	96,611	802,945,910	1,288,419,933

*First year carriers were required to file annual reports with the Interstate Commerce Commission.
†Subject to change.

There are additional pipe line companies not subject to the Interstate Commerce Commission jurisdiction and not included in the above statistics.

Railroad Position

More attention will in the future have to be given to oil pipe lines by the Interstate Commerce Commission because of their relation to the competitive struggle among various transportation agencies for traffic. Last year the commission's Bureau of Statistics made a study of the fluctuations in railway freight traffic in relation to production. Taking the average annual tonnage of the three-year period 1923-25 as a base it was shown for various classes of commodities how the railroad tonnage has changed in relation to the total production since that time. It was found as to crude petroleum that in the average base period year the railroads originated 9,353,000 tons, but in 1936 the corresponding total was only 3,471,000 tons, or only 37.1 per cent of the base year, or a reduction of 62.9 per cent. At the same time, the production of crude petroleum had increased 49.1 per cent. In short, while production of crude petroleum had greatly increased, the railroads' share had vastly decreased. If the railroad tons had increased in proportion to the production, they would have aggregated 13,945,000 tons instead of the actual 3,471,000 tons, indicating a hypothetical loss of 10,474,000 tons of crude petroleum for the railroads.

A similar computation for refined petroleum and its products shows that although the 1936 tonnage produced in the United States was 63.1 per cent greater than in the 1923-25 period, the railroad tonnage of this class of commodities increased only 28 per cent. If it had increased in the same proportion as the production, the railroads would have originated 14,529,000 more tons of refined petroleum and its products than they actually did in 1936.

Of the total crude petroleum produced in the base period, 1923-25, 8.3 per cent was hauled by the railways and in 1937, 2.1 per cent.

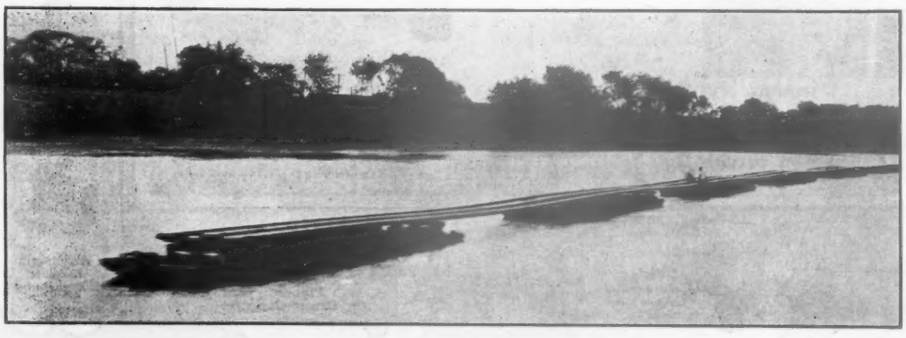
The railways first reported gasoline separately in 1928, during which year they hauled 86.1 per cent of the total production of gasoline, and in 1937, 53.6 per cent.

In addition to taking a diminishing share of the total production of crude and refined oil, the railroads have also been compelled by competition to reduce their rates on the traffic retained. Nevertheless, petroleum is still one of the most important classes of traffic for the railways, as shown by the following figures for the year 1937:

TABLE 5—STEAM RAILROAD REVENUE IN 1937 FROM SPECIFIED COMMODITIES

Crude petroleum	$9,698,893
Petroleum oils, refined and all other gasolines	169,278,364
Fuel, road, and petroleum residual oils, N.O.S.	43,202,708
Lubricating oils and greases	21,124,220
Petroleum products, N.O.S.	1,664,349
Total	$244,968,534

This may be contrasted with the $154,714,140 from livestock, meat, and all other animal products, and with the $68,757,310 from wheat. In fact, the revenue from petroleum and its products was greater than from all grain and flour combined.



Stringing pipe for river crossing in the East

Houston A.P.I. Chapter to Resume Production Meetings

HOUSTON, Tex.—Regular meetings, suspended during the summer, of the Houston Chapter of the American Petroleum Institute, Division of Production, will be resumed Monday, September 26. The first meeting will be held at Brae Burn Country Club.

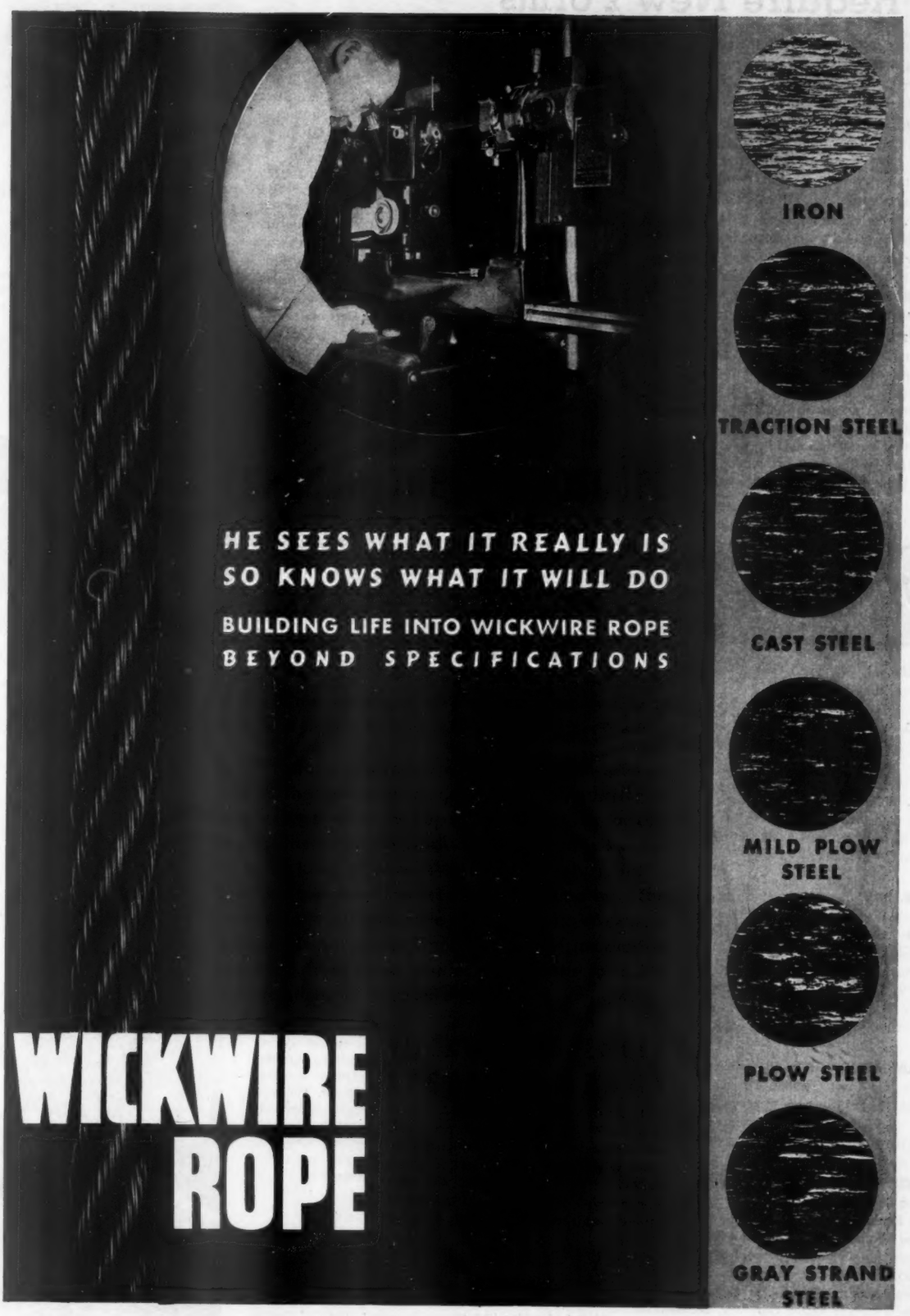
Monday afternoon will be spent on the golf course. Following dinner Myron M. Kinley will show his collection of motion pictures of oil well fires and methods of control and will lead an open discussion on wild well control.

Industrial Tax Representatives Will Meet in Ardmore, Sept. 23

The monthly tax dinner meeting of the petroleum industry tax representatives, Kansas-Oklahoma area, will be held at 6:30 p.m. on Friday, September 23, at the Ardmore Hotel in Ardmore, Okla. George N. Otey, attorney, Ardmore, will preside. W. C. Wright, certified public accountant and tax consultant, Ardmore, will present a discussion on "Taxation of the Stripper Well." R. M. Chan, comptroller, Magnolia Petroleum Co., Dallas, Tex., will speak on "Unemployment Benefits Procedure." The balance of the meeting will be devoted to open forum discussions.

Magnetic Storm

Tucson, Ariz. observatory of the U. S. Coast and Geodetic Survey report a moderate magnetic storm began at 1 p.m., September 13 and ended at 11 p.m. the same day. Another moderate magnetic storm began at 9 a.m., September 14 and ended at 10 p.m., September 15. All time central standard.


HE SEES WHAT IT REALLY IS
SO KNOWS WHAT IT WILL DO
BUILDING LIFE INTO WICKWIRE ROPE
BEYOND SPECIFICATIONS
WICKWIRE
ROPE
IRON
TRACTION STEEL
CAST STEEL
MILD PLOW STEEL
PLOW STEEL
GRAY STRAND STEEL

Reports on Pipe Line Overages Will Require New Forms

AUSTIN, Tex., Sept. 19.—Hearing on pipe line overages held last week was recessed pending a hearing upon reporting forms which will be held in the near future by the Railroad Commission. V. E. Cottingham, chief of production for the commission, indicated upon conclusion of the hearing that new forms to be required by the commission may compel major trunk lines to account for and make up all overages in their lines. The two-day hearing was held after the commission had refused tenders on overages accumulated by interfield lines in East Texas and owners of the systems charged discrimination in that trunk pipe lines were allowed to move their overages out of the field.

Renne Allred of Tyler, whose petition to move overage oil in East Texas brought on the hearing, contended that state-wide pipe line systems absorbed overages in East Texas oil by shortages in other areas. The smaller gathering systems were being discriminated against, he claims, because they must report their oil within the field where it is finally disposed of and any overages are charged back against their allowables. Four large companies with overages in East Texas indicated by pipe line reports were questioned at length as he sought to develop if there was justification for overage oil. Some confusion resulted from construing the reports of the companies as they did not distinguish between net and gross measurements and some used both.

G. I. Carlisle, commission employe in East Texas, stated that most systems operating state-wide systems showed shortages in over-all operations, but quite a few of the gathering lines of all companies showed overages in the field prior to its entry into trunk lines. Rex Baker of Humble Oil & Refining Co. brought out in questioning Carlisle that companies which make correction for temperature and basic sediment and water showed shortages, while those which do not are among the ones with overages. Herman Heard, in charge of pipe line reports for the commission, presented figures to show that during 1937 the lines listed overages of 325,000 bbls., shortages of 185,000 bbls., and a net overage of 140,000 bbls. Because some companies reported gross and others net oil, accuracy of these figures was questioned.

Obituaries

W. T. HALES, 71, Oklahoma City oil operator, died in Los Angeles, Calif., last week.

GERDEN C. WRIGHT, 47, chief clerk for Oklahoma Pipe Line Co. for 15 years, died at his home in Tulsa last week.

EDWIN V. RICHARD, 42, independent operator of Houston, Tex., died last week in Santa Fe, N. M. From 1922 to 1926 he was connected with the Miles Bennett Products Co. in West Texas.

GEORGE B. RAY, 60, independent operator in East, West and South Texas, died in Wichita Falls, Tex., September 15. He got his start in the oil business in the Burkburnett field about 1911. With the discovery of the East Texas field, he became associated with R. H. Venable and W. L. Clanahan of Tyler. Within the past 18 months, Mr. Ray had moved his operations into the Polk County territory in South Texas.

JAMES EARL WOODWORTH, 55, for seven years an accountant for East Texas Refining Co., died in Dallas, Tex., last week. In 1919 he was employed by Marland Refining Co., and later became secretary-treasurer of Marland Oil Co. of Mexico.

MAX FUHRMAN, 42, was killed by a fall from the tenth floor of a San Francisco hotel last week. He came to the United States in 1919 from Furfeld, Rhinehessen, Germany, and organized the Fuhrman Petroleum Co. In 1930 he sold his Oklahoma properties to Transcontinental Oil Co. He held a directorship in the Fuhrman Petroleum Corp., Midland, Tex. After selling his properties here, Mr. Fuhrman visited Germany, but returned last April to San Francisco to receive treatment for a nervous ailment.

C. C. ROSS, 54, minister of lands and mines for Alberta from 1935 to 1937, died at Vancouver, British Columbia, on September 12. Between 1919 and 1931 he was intimately associated with Alberta oil development as supervising engineer at Calgary for the federal Department of the Interior.

JOHN T. O'MARA, 64, identified with the oil and gas industry 45 years, died at Buffalo, N. Y., after a brief illness. He had been connected with Iroquois Gas Co. for 34 years in the production and maintenance department. He spent three years in Texas as a field supervisor for Texas Co. His brother, George O'Mara, who died in California a year ago, was internationally known as a driller in India.

H. H. GREENE, 38, vice president, Kendall Refining Co., formerly with Sinclair, Wellsville, N. Y., and Lion Oil & Refining Co., El Dorado, Ark., was killed flying alone from the National Petroleum Association meeting in Atlantic City when his plane crashed in a bog during rain and fog 20 miles southeast of Camden, N. J. He was born at Alma, N. Y., March 22, 1900. He had 10 years of flying experience and was an officer in the Air Corps Reserve. He left Atlantic City at 5 p.m. Sunday and the plane was found Monday morning.

British Columbia Gasoline Regulation Considered

VICTORIA, British Columbia.—The British Columbia government is now licensing all gasoline distributors, and it is planned to use this control as a means of regulating gasoline prices and standards. The government plans to prohibit giving of premiums or subsidies by wholesalers to retailers to get business. A draft of proposed regulations is being submitted by Dr. W. A. Carrothers, chairman of the coal and petroleum price-fixing board, to all oil companies.

THE MARKETS*

CRUDE OIL: *The reduction of 15 cents per barrel in Smackover, Ark., crude applies to approximately 18,000 bbls. daily. While explained as an adjustment to conform to other crudes in the state, the reduction is considered of major importance by many who feel that it reflects an unsatisfactory refinery market situation. Several buyers refused to meet a recent advance in high-gravity crudes in Texas fields and the company which announced the change has returned to the former schedules in most of the fields.*

REFINERY: *Strength in refinery markets is largely confined to the light heating oils and wax for which there is strong demand. Refinery and natural gasolines are generally weak with price reductions in several areas. Heavy fuels weak.*

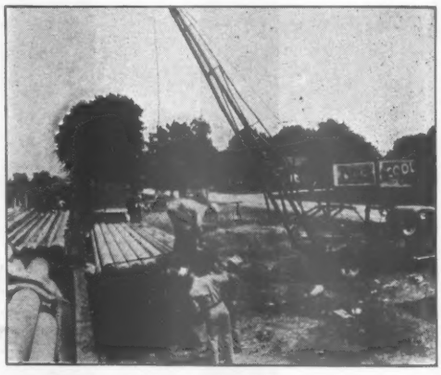
TANK-WAGON AND POSTED DEALER: *Prices on regular and premium grades steady. Wide variation in quotations on third grade.*

FINANCIAL: *Common oil stocks at lowest levels since June. Average of 30 representative stocks for week ending September 17: High, 28.34; low, 25.89; close, 26.46. Week ending September 10: High, 29.19; low, 27.86; close, 28.03.*

**Detailed information in Market Section.*

Stove-Pipe Method Employed In Laying Illinois Loop

In the recent laying of a 12-mile loop in Illinois for the Illinois Pipe Line Co., the stove-pipe method was found to be especially adapted to solving the problems of the job. The loop was an 8-inch line running parallel to the main 6-inch line that handles



Unloading wrapped and coated joints

Sandoval and Centralia crude. On completion it was estimated that stove piping made it possible to do the work with a saving of a third of what it would have cost with a firing line. Where orchards and railroads had to be traversed, sections of 300 and 400 feet in length were snaked into place. General Paint Corp. mill coating and wrapping was applied at the mill before shipment to the job; after welding the line, unprotected areas adjacent to the weld were coated and wrapped before lowering into the ditch. The line was laid by the White Deer Pipe Line Construction Co., Inc. Welding was done by the H. C. Price Co., which reports that seven welders were employed, two tackers and five bellhole welders. The country was average Illinois country with one river crossing at the Kaskaskia River; work was completed in 19 days; no unusual conditions were encountered during construction.

Stove-pipe method cuts handling to a minimum

Build at a bargain

In the Chicago district it is estimated that refinery equipment costs where steel is a predominant factor are 7 to 10 per cent less than several months ago—
NATIONAL PETROLEUM NEWS, July 6, 1938

A Dubbs cracking unit is largely steel and now is the time to buy it

Build a Dubbs cracking unit at today's low steel prices and it will have to work less time to pay for itself

And the sooner it will go to work earning money for you

Dubbscracking 5 cents a barrel throughput
—beginning October first

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

Twelve thousand-barrel refinery of Atlas Pipe Line Company at Shreveport, Louisiana

Refinery Expansion

Building of New Kansas Refinery Being Considered

The Consumers Cooperative Association is considering construction of a 3,000-bbl. plant in western Kansas. If plans being made now are carried out, construction will commence late this fall in order that it may be completed and ready for operation some time in the spring. It is the intention of the association to have this plant supply cooperatives in northwestern Kansas, eastern Colorado, and western Nebraska. The new refinery is to be incorporated under the Kansas law providing for cooperatives.

Sun Oil Co. Will Install Phenolate Plants

Sun Oil Co. has awarded contracts to the Koppers Co.'s engineering and construction division for two Koppers phenolate plants for the purification of refinery still gas. A plant employing a two-stage system with a capacity of 10,000,000 feet of gas is to be erected at the oil company's Toledo, Ohio, refinery. A single stage plant is to be provided for the Marcus Hook, Pa., refinery, which will have a daily capacity of 12,000,000 feet of gas. This process uses a sodium phenolate solution for low cost recovery of hydrogen sulfide from refinery still gas. This may be converted into sulfuric acid for plant use or for the market.

Opening of Lima Refinery Plant Is Uncertain

Lima Crude Refining Co. plant at Findlay, Ohio, has been closed for several weeks. The plant was handling some 20,000 bbls. of crude oil a month, largely from the Lima field where it furnished an outlet to independent producers in that area. A large part of the output of the Lima field is being taken by Pure Oil Co. at Toledo, Ohio.

Sales of Ethyl Gasoline Rose 30.8 Per Cent in Half Year

Sales of Ethyl Gasoline during the first six months of 1938 rose 30.8 per cent compared with the same period of 1937, according to reports to Ethyl Gasoline Corp. from customer oil companies. One hundred and eighteen oil companies throughout the United States contributed to this report.

Very little of this increase was due to the general increase of gasoline consumption, the major part being due to passenger car owners changing from other grades to premium gasoline, officials of Ethyl Gasoline Corp. explained. The gains ranged from 8 per cent in Utah to 127 per cent in Mississippi. North Dakota, with a loss of 16 per cent, was the only state to show a decrease.

The largest divisional percentage advance—49 per cent—was registered by the Atlanta Division of the corporation, comprising Alabama, Florida, Georgia, Louisiana, Mississippi, and Tennessee. The Tulsa Division, composed of Arkansas, New Mexico, Oklahoma, and Texas, was second with a rise of 40 per cent.

Ben Franklin Ardmore Plant Is Nearing Completion

Ben Franklin Refining Co. is nearing completion of the rebuilding program which has been carried forward since this company was organized to acquire the refinery at Ardmore, Okla., which was formerly owned by Wirt Franklin. In carrying out this program, a cracking still has been added to previous equipment. Dr. I. Arthur Anson is general manager of the reorganized plant. The Ben Franklin plant will run on Healdton crude; marketing of the products will be handled by Bell Oil & Gas Co.

Eason Oil Co. Will Close Enid Plant Temporarily

Eason Oil Co. of Enid, Okla., will temporarily shut down its Enid refinery. According to President T. T. Eason, this step has become necessary because of inability to purchase 1,400 bbls. of northern Oklahoma crude to run through the skimming plant. The cracking plant was damaged by a recent fire and will be shut down until the plant is rebuilt.

Labor Board Recommendation In Ponca City Case

FORT WORTH, Tex.—The National Labor Relations Board examiner who heard a complaint against Continental Oil Co. has recommended the company withdraw all recognition from the employes union in the Ponca City, Okla., area, Edwin A. Elliott, regional NLRB director, said. The recommendation was made by E. R. Strempel, who conducted a hearing from June 13 to June 21.

The company won one point. It had been alleged that Ira C. Potts had been discharged because of union activity.

Pipe Line Activity

Slides Force Rerouting of Los Angeles Gas Lines

LOS ANGELES, Calif.—Los Angeles narrowly escaped a natural gas famine when a landslide of between 12,000 and 14,000 tons of soft shale that partially blocked the Ridge Route near Grapevine came dangerously near severing three huge gas mains serving the city. These lines, of 22, 24 and 26-inch diameter, along with several oil lines, must be rerouted.

Michigan-Toledo Pipe Line Co. Files Michigan-Ohio Rates

The Michigan-Toledo Pipe Line Co. has filed the following local rates to Bay Shore or Toledo, Ohio; from Mount Pleasant, Crystal or Purtell stations, Mich., 11⅓ cents; from Buckeye or Edenville stations, 14 cents; from St. Johns station 8 cents, and from Chelsea station, 3½ cents.

German Proposition for Turner Valley Line

CALGARY, Alberta. — The Alberta Petroleum Association has received from Tropicorp, Inc., a proposition for the construction of a crude pipe line from Turner Valley to the Pacific Coast, to be financed on a long-term credit basis with part payment in crude and lubricating oils.

The corporation, represented by Dr. Edward W. Wilhelmi de Marre, has offices in Germany and agencies in various countries, and proposes to supply the necessary materials and work according to U. S. standards.

No action will be taken by Calgary oil interests until the matter has been discussed with the federal government at Ottawa and with representatives of the British Government.

Continental Pipe Line Valuation

Interstate Commerce Commission has placed a final valuation of $4,100,000 for rate making purposes on properties of Continental Pipe Line Co., owned and used for common carrier purposes, as of December 31, 1934.

Kansas Pipe Line & Gas Co. Asks Permit for Mesaba Line

WASHINGTON, D. C.—The first application seeking authority for construction of a pipe line under the Natural Gas Act was filed last week with the Federal Power Commission by Kansas Pipe Line & Gas Co.

The application seeks authorization for building a line from the Hugoton gas field in southwestern Kansas to the Mesaba Iron Range in Minnesota, together with branch and lateral pipe lines extending to points in Kansas, Nebraska, South Dakota and Minnesota

at a total cost of $21,470,000. The company's application for an R.F.C. loan of $20,000,000 to finance the project is pending before that commission.

A total of 129 cities, towns and villages having a combined population of more than 370,000 are to be served through the proposed facilities. None of these communities has access to natural gas.

The estimated cost of construction, as shown in plans filed are: Main line, consisting of 1,040 miles of various pipe sizes, $12,675,680; tap lines, consisting of 1,306 miles of various pipe sizes, $3,480,000; six compressor stations, $2,300,000; crossing Platte River, $50,000; crossing Missouri River, $50,000; other river, highway and railroad crossings, $100,000; miscellaneous construction costs, $600,000; right of way and damages, $1,000,000; engineering, legal, administration and overhead fees, $1,214,320.

The company estimates the annual gross revenue for the first five years as follows: $3,024,447, $3,691,090, $4,241,590, $4,785,327, and $5,469,847. It estimates annual sales beginning with 13,623,080,000 feet in the first year and increasing to 20,165,390,000 feet in the fifth year.

Proposed Line From K.M.A. Area To Gulf Coast Terminal

WICHITA FALLS, Tex.—At a meeting of operators in the K.M.A. pool D. H. Bolin, president of the Wichita Falls Chamber of Commerce and an operator in the field, announced that operators were being canvassed on a proposition to pledge production to the Hope Engineering Co. of New York for five years as a basis for construction of an 8-inch pipe line to the Gulf Coast. It was stated that the proposition involved purchase of 10,000 bbls. at the posted price or to the maximum of the new carrier. The Hull and Silk pools of northern Archer County are to be included in the agreement, if consummated.

Eighteen-Mile Gas Line Permit Granted in Arkansas

Arkansas-Oklahoma Gas Co. has been granted a permit by the Arkansas Utilities Commission to build an 18-mile line connecting its wells with a line near Vesta. Franklin County.

Repressuring Is Suggested In Turner Valley Field

CALGARY, Alberta.—Suggestions that repressuring of the older sections of the Turner Valley field be undertaken were laid before the Calgary city council recently by Alderman James Mahaffey. While Turner Valley waste gas has been used to repressure the Bow Island field, no attempt has been made in Turner Valley itself, due partly to the fact that rock pressures, even after 14 years' continuous production, are still high in most wells.

At one time Royalite Oil Co. drilled a test well with a view to utilizing the upper sands of Turner Valley for storage of waste gas; but the project was not carried further.

Natural Gas News

H. L. Farrar New President of Pacific Coast Association

LOS ANGELES, Calif.—H. L. Farrar of San Francisco was elected president of the Pacific Coast Gas Association, in convention at Montecito, and will succeed Norman R. McKee of Los Angeles. A. E. Holloway, vice president of the San Diego Consolidated Gas Co., was elected vice president.

With registration indicating an attendance of 700, the three-day convention was the largest gathering of gas industry officials ever assembled in the Pacific Coast area.

Gas Rates at Big Spring On Sliding Reduction

BIG SPRING, Tex.—P. Kenney, manager of Empire Southern Service, here, in announcing a downward revision of gas rates for Big Spring, said the reduction will be graduated at the rate of 1 cent each month per 1,000 feet excess over the 1,500 feet minimum. This will continue until the rate reaches 63 cents for the bracket which covers most domestic users. The current rate is 67 cents. Commercial rates were revised also.

Canadian Gas Production

OTTAWA, Ontario.—Natural gas production marketed from all Canadian fields in June totaled 1.717,143,000 feet compared with 2,127,894,000 feet in May and 1,421,000,000 feet in June, 1937. For the six months of 1938 production aggregated 17,958,532,000 feet against 16,047,000,000 feet in the same period last year.

Imports of mixed (natural and artificial) gas in June amounted to 10,372,000 feet valued at $6,656 compared with 9,409,000 feet valued at $6,061 in May.

Turner Valley Natural Gas Restrictions Postponed

CALGARY, Alberta.—Enforcement of the order of the Alberta Petroleum and Natural Gas Conservation Board restricting the aggregate production of Turner Valley gas wells to approximately 40,000,000 feet a day has been postponed till October 15. The order was to have taken effect September 14.

Enforcement was postponed to allow for sufficient naphtha production to fill immediate seasonal demands, and also to enable the operators to take the requisite measures for repressuring the Turner Valley field.

The repressuring scheme, estimated to cost $2,000,000, is being considered by owners of Turner Valley gas wells. Under the plan, it is proposed that gas wells be allowed to flow unrestricted, the naphtha being extracted and the residual gas pumped back into two or three storage wells. The project would assure owners a steady revenue from naphtha, and eliminate gas wastage.

Under gas conservation orders, some 96 Turner Valley gas-naphtha wells will be permitted to produce only 40,000,000 feet of gas per day. Previous wastage was estimated at 250,000,000 feet a day.

Natural Gasoline

Rio Bravo Natural Gasoline Plant Put in Operation

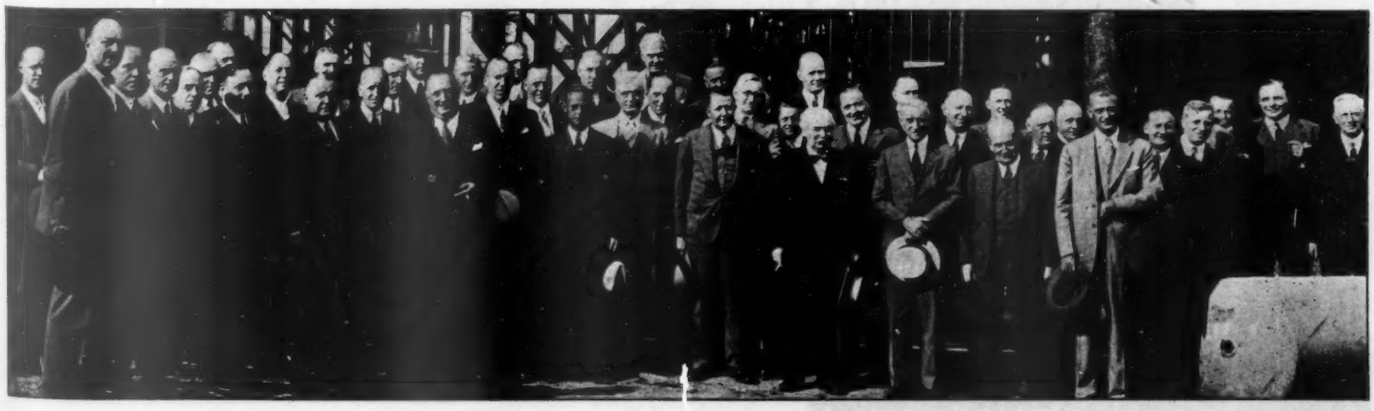
LOS ANGELES, Calif.—The recently completed natural gasoline plant constructed in the Rio Bravo field of Kern County by Union Oil Co. and Superior Oil Co. as a joint undertaking, operated by the former company, was put in operation a few weeks ago. This plant which represents a capital investment of approximately $500,000 has a rated capacity of 20,000,000 feet daily but the basic equipment is of sufficient size that the capacity can be increased several times the present rating with minor additions.

The plant is at present treating approximately 5,000,000 feet of gas per day from which about 3,000 gallons of natural gasoline is recovered. None of the dry gas is being moved out of the field as current production, due to the curtailment in effect; the supply of dry gas is just enough to take care of drilling requirements. The natural gasoline produced is being moved by truck and trailer to Union's Maltha refinery near Bakersfield.

This single unit plant which is of the latest design is on a site leased from Kern County Land Co. in close proximity to Union's discovery well at Rio Bravo. Instead of the conventional steam method of operation, this new plant uses direct fired heaters and all low pressure gas is compressed by two of the latest angle type compressors and treated at 500 pounds pressure. When the gas is marketed it will be available to gas companies at 500 pounds pressure which is more than sufficient to buck normal transmission line pressures.

Bureau of Mines Estimate for October 3,366,800 Bbls.

WASHINGTON, D. C., Sept. 20.—Bureau of Mines forecasts average daily supply of domestic crude required to meet market demand in October at 3,366,800 bbls., or 77,500 bbls. less than estimate for September.



Board members of the American Gas Association and the Association of Gas Appliance and Equipment Manufacturers visiting the Gas Exhibits Building at the New York World's Fair 1939

CAST IRON PIPE Is Usually The Cheapest In The End

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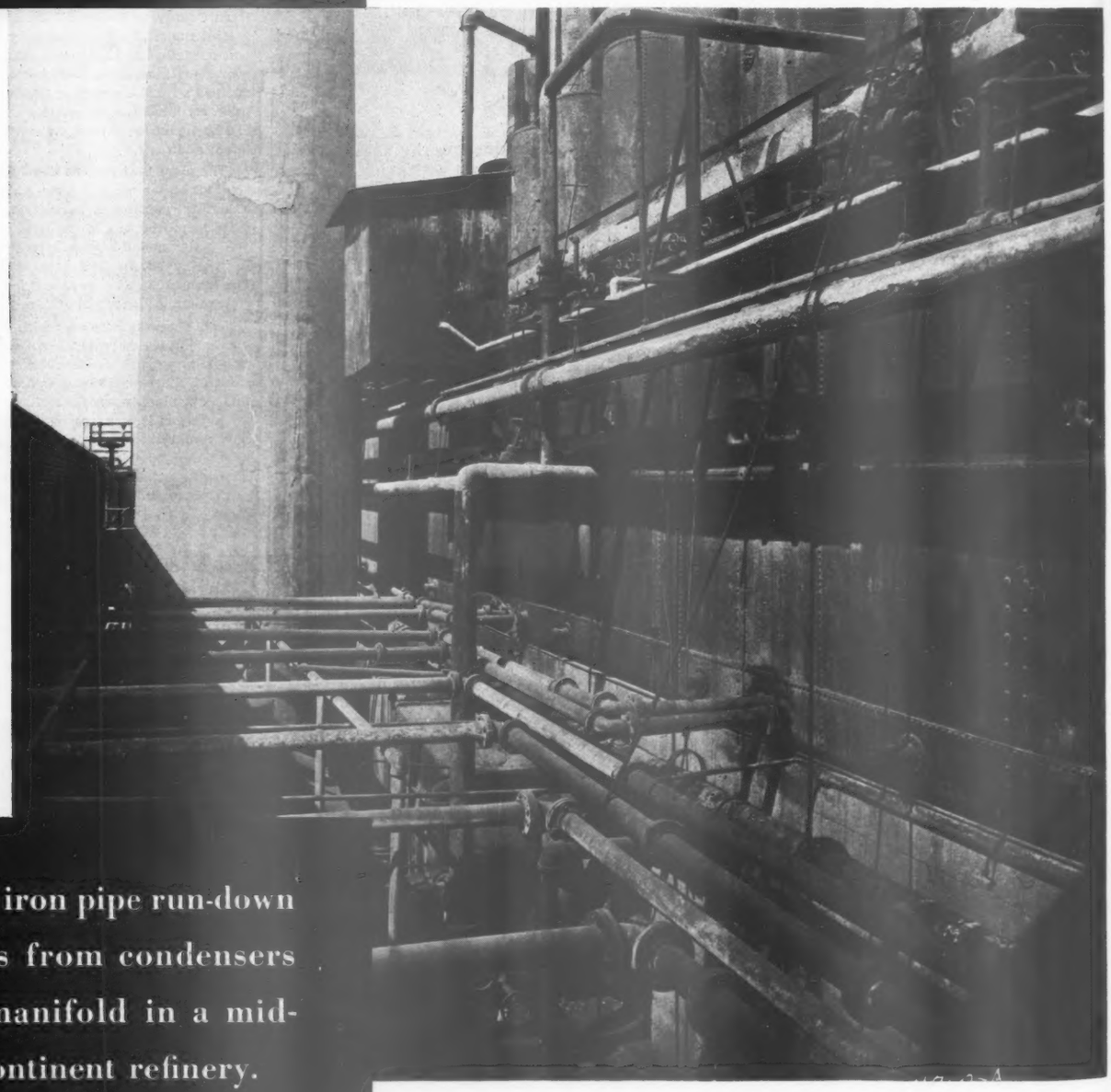
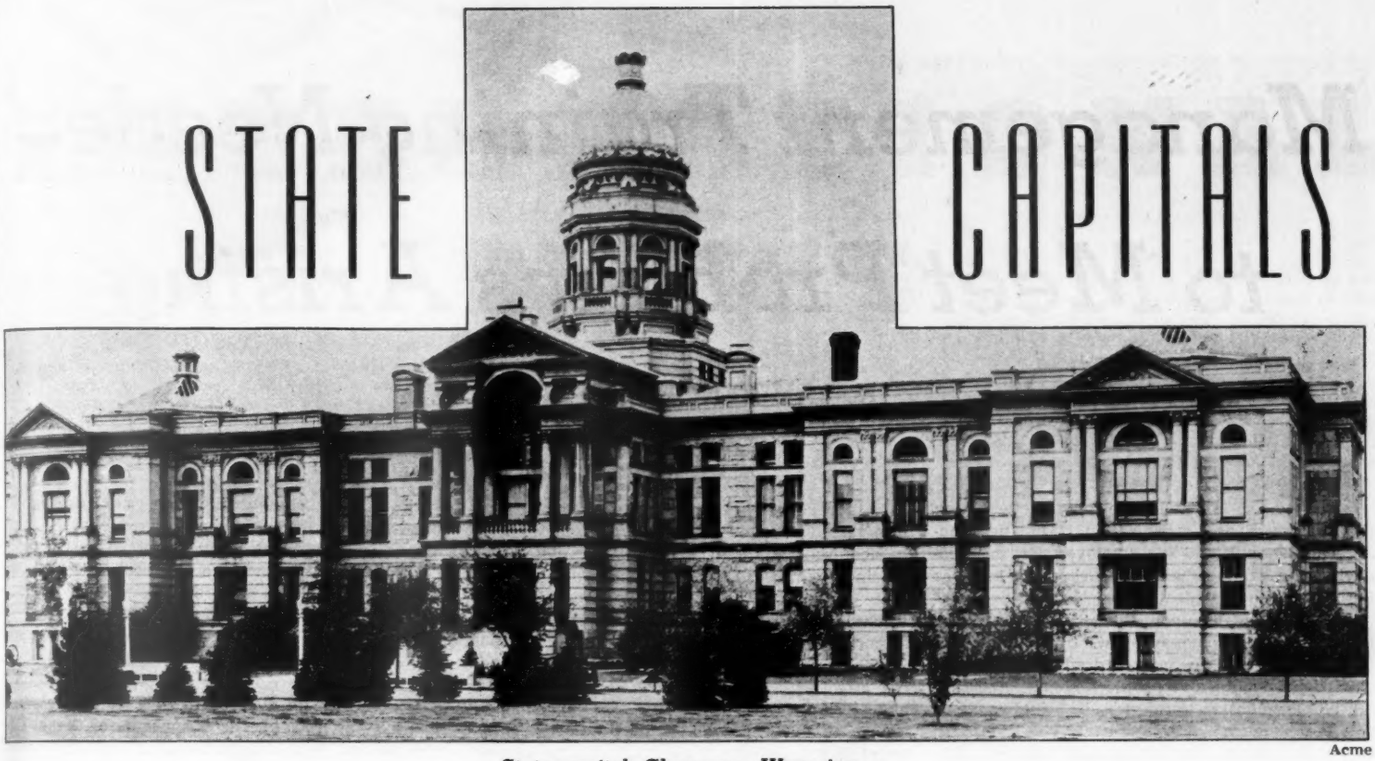
NEITHER lowest nor highest in first cost, cast iron pipe is usually the cheapest in the end for many refinery applications. Nearer to the natural element than any other ferrous material, its resistance to corrosion is inherent. Cast iron pipe is a dependable, long-lived, relatively low first-cost material with a definite salvage value. Measured by length of service and maintenance it is an economy factor in refinery operation. Available in bell-and-spigot, plain or threaded end, and flanged types, or with bottle-tight mechanical joints for high pressures. Diameters from 1¼ to 84 inches. Address inquiries to The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 1015 Peoples Gas Building, Chicago.



Cast iron pipe run-down lines from condensers to manifold in a mid-continent refinery.

STATE CAPITALS



Acme

State capitol, Cheyenne, Wyoming

OKLAHOMA

OKLAHOMA CORPORATION COMMISSION has called a hearing of crude oil purchasers and producers on September 27 to discuss October's petroleum requirements and to establish allowables for that month.

TEXAS

SATURDAY AND SUNDAY SHUTDOWNS were ordered continued through October 23 by the Railroad Commission of Texas at its meeting on September 19. The fields will not be shut down on the last Saturday and Sunday of October as the commission wants only four such closings in a month. The basic allowable production in October was placed at 1,275,122 bbls. per day as against 1,240,953 bbls. for the period September 1 to 17.

C. V. TERRELL, CHAIRMAN of the commission, resigned that office but will continue as a member. Private affairs requiring more attention were given as the cause of his resignation. Col. Ernest O. Thompson was elected in his place. Mr. Terrell was defeated for reelection in the recent primary by G. A. (Jerry) Sadler of Longview.

THE RODESSA FIELD in Texas was exempted from the Saturday and Sunday closings because it lies in three states and is not subject to closing in the two other states, Louisiana and Arkansas.

District allowables as of September 1, September 19 and October 1 were as follows:

East Texas, 516,147, 516,959 and 517,816; Panhandle, including Moore County and Osborne area, 82,912, 83,292 and 83,292; North Texas, including Anderson-Kerr, Foard County, K.M.A. and Gant pools, 88,008, 89,926 and 89,926; West Central Texas, 79,067, 80,767 and 80,691; West Texas, 223,578, 228,645 and 236,484; East Central Texas, 112,163, 112,917 and 112,993; Southwest Texas, 292,805, 298,-236 and 301,607; Gulf Coast, 254,813, 259,353 and 264,810.

SHARP CRITICISM was directed at refiners at last Friday's meeting by Commissioner Thompson, who claimed that large quantities of gasoline were being made, which product was not needed in the market, and which threatened to break the market in the dull season. "Crude stocks are low enough," said Colonel Thompson, "but refiners are putting through such quantities as to make even more gasoline available on top of already heavy stocks. It is unfortunate for the industry that this practice is being followed."

KANSAS

THE KANSAS CORPORATION COMMISSION Saturday, September 17, ordered 3,500 bbls. of allowable crude oil production to be carried as a shortage in ratable takings against the Phillips Petroleum Co. for the remainder of the month. The order is subject to the proration hearing for October to be held at Wichita, Friday, September 23, when the allowable will then be adjusted.

In its order the commission explained that it was unable to find a market which would handle the oil refused by Phillips. Tuesday the commission held a hearing on the matter after Phillips had advised that it would reduce its ratable takings from Kansas oil wells to the amount of 15 per cent.

More than 10,000 bbls. of allowable oil would be withdrawn from the market were the Phillips reduction to be applied to offset leases in the same percentage to avoid drainage and avoid discrimination by enforcing ratable takings.

FRANK PICKELL, general superintendent of production for Stanolind Oil & Gas Co., backed by other oil men, wants a revision of Rule 110 of the Kansas conservation rules. Kansas operators are now permitted to produce oil from only one pay level in the well. Mr. Pickell has proposed that they be permitted to produce from all the several sources of supply a well may have. He called attention to the Fairport pool in Russell County as an example. In that field the Tarkio, Topeka, and Dodge limes are productive. These formations were passed up when the field was being developed years ago, and he says that while none of the zones singly might produce in paying quantity the total of them might do so.

CALIFORNIA

THE CENTRAL COMMITTEE of California Oil Producers will meet in a few days to designate the state's allowable production for October and will probably begin reducing the allotment in line with the decline in consumption incident to the winter season. The state's allowable during the year to date has not shown the large variations that characterized past allotments, the committee attempting to maintain a more even trend in order to prevent wide variations in production and substantial fluctuations in output. The Central Committee did not make any change in the allowable for September. A reduction had been expected in some quarters but the policy adopted is in keeping with changing conditions principally in offshore markets. California advices indicate that shipments of gas oil and burning oil to the East Coast for domestic consumption will be somewhat below normal expectations due to stock accumulations east of the Rockies. Integrated companies having California subsidiaries will, however, make shipments to the Atlantic Coast during the winter period. The movement of furnace oil to the East Coast generally starts in October and with the price of this commodity relatively soft in California some unexpected commitments might be made within a few weeks. The failure of general business on the Pacific Coast to show expected gains does not make the local situation look any too good. Considerable labor trouble in the San Francisco Bay region has proved a severe handicap to business and this has been reflected all along the line from Vancouver, British Columbia, to the Mexican border.

LOUISIANA

CADDO CRUDE OIL PURCHASING CO., a Grogan subsidiary, has announced that retroactive to September 15 it will take only 60 per cent of the allowable production to which its lines are connected in the Lisbon field in Claiborne and Lincoln parishes. It made no change in the price it pays for oil in that field.

Management Training Needed to Meet Problems Arising

By LAWRENCE A. APPLEY
Supervisor, Education and Training,
Socony-Vacuum Oil Co., Inc.*

The ultimate factor determining the success of any organization is the performance of the rank and file employes who are producing the products and rendering the services for which the organization exists. This performance is dependent upon the planning and the leadership of its management. In between top management and the rank and file are line and staff departments and people who are assisting top management and employes in bringing about this performance.

Clarification of line of authority and of responsibilities and of relationships is necessary for smooth functioning of the organization.

A major contribution of modern executives to the advancement of management is the development of executive training programs. Training for rank and file employes has been highly developed, but executive training is a recent development.

Executive training programs are in operation today in many different countries and in different types of organizations. They are successful and their contribution to better operation is steadily increasing. If a management believes such a program is of value and feels that it is necessary to the solution of certain fundamental problems, a satisfactory method can be found to accomplish the desired objectives.

Factors Involved

Approximately 80 per cent of the personnel of an organization consists of the rank and file employes. A small fraction of 1 per cent is top management, whose job it is to see that the employes are performing skillfully "in the right place, at the right time, in the right heart." In between these two groups is the balance of the organization, through which top management performs its job. If there is friction, misunderstanding or confusion in this intermediate group, performance of the rank and file will suffer and effectiveness of top management will be decreased.

Assuming general agreement that training and education are necessary activities, there are two phases in their application that need equal attention and emphasis: Training of the workers in job skill, and training of the leaders in management technique. Technical training for the workers has been developed to a high degree of effectiveness over a long period of years, while training in management is a recent development and is a definite contribution by modern executives to the advancement of management.

In some cases the skill of the workers has been developed to a point beyond the capacity of their supervisors to put it to best possible use.

The executives of today are squarely facing this issue and are constructively giving time to its solution. They are conscious that technical performance in the production of services and products is threatened. They realize that leadership, supervision and management involve definite techniques and skills and that they cannot be acquired merely by exposure to situations requiring their use. They realize that the intermediate group, between top management and the workers, will not of its own volition function smoothly and constructively or create a situation in which leadership and management can operate effectively, without a conscious, continuous and well-planned effort by top management toward this end. Such is the purpose of executive training programs.

Causes of Confusion

There are many problems causing confusion in between top management and the rank and file. Lines of authority, proper alignment of responsibilities, who reports to whom, relationships with superiors, associates and subordinates, relationships between staff and line, organization structure, all need clarification. Practically all business activity is a matter of contacts. If there is any confusion as to the reasons for or the results of such contacts, misunderstanding, loss of time, wasted effort, duplication, omission, friction and noncooperation result. These impede progress. They affect the performance of the workers. They are costly.

Most executives are acquainted with conditions that should exist and with fundamental principles involved. Many of them have been searching for a method which will bring these conditions about and will put these principles into practice. Their time has been absorbed with the handling of difficulties arising from the existence of unfavorable conditions and with various outside demands and influences. Therefore, they have appointed men to assist them in the clarification and elimination of these issues and in promoting sound management practices. The medium used is training and education.

In speaking of executive training, we do not mean formal classroom courses for executives by special instructors. What we do mean is that executives take the time to analyze what they are doing, how they are doing it, what better methods might be employed, and are discussing these matters freely with the next executives in line at regularly appointed intervals.

First Step

The first step in an executive training program is the preparation of written statements of individual responsibilities and authorities of members of the executive staff. The top executive of an organization has complete authority and responsibility for all that takes place in the organization. However, it is impossible for him to exercise this personally, so he delegates parts of it to various members of his staff. The statement of his position will therefore include only responsibilities and authorities which he keeps himself. The statements of his executive staff will indicate those which he has delegated.

After the initial statements are prepared, they are abbreviated as much as possible and set up on a chart, side by side, so that comparisons may be made. This is done in group discussions which are entirely constructive in nature. The chart shows very clearly any differences in conceptions, any omissions or duplications that exist. Such situations are clarified, usually by ultimate decision of the chief executive. The original write-ups are altered in accordance with these decisions, and final complete descriptions are written.

These descriptions generally include the following items: First, the objective of the position. The position exists for the purpose of creating certain conditions which would not be created if there were no such position. These conditions are stated in the objective. Second, the individuals are listed who are directly responsible to this position without intervening supervision. Third, the individual is indicated to whom the position described is accountable. Fourth, the functions are listed in detail under major divisions of activity and clearly indicate the authority involved.

Organization Manual

When all of the descriptions have been prepared and finally edited, they are bound together in an organization manual. This manual also includes an organization chart, indicating the lines of authority and certain organization rules to insure proper functioning.

The preparation of these position statements is training in itself. Many problems are solved and many relationships are straightened out which have caused misunderstanding and friction. Also in the course of the discussions, the responsibilities of associates become better known, which in turn is very helpful.

The second step in the program is to establish a definite schedule of executive group conferences, purely for the purpose of considering executive and managerial methods of performing the functions for which they are responsible. It is necessary to establish a definite time in order that all members can be present and proper preparation may be made. Usually this time consists of one or two days a month, supplemented by a complete week once a year. The important item is that the time is definitely established. The usual practice is to name a day and a week, such as the second Wednesday of each month and the first week in May of each year.

These training sessions deal with subjects such as executive obligations, objectives and policies; proper alignment of functions, responsibilities and authorities; relationships between staff and line; fundamental principles underlying organization structure and of proper organization setups effectively to meet the situations involved; staff requirements and individual standards for successful job performance.

*From paper before seventh International Management Congress, Washington, D. C.

INTERNATIONAL NEWS

13 Venezuelan Fields Produce 530,143 Barrels of Oil Per Day

Venezuela's estimated crude oil production was increased by 12,347 bbls. in daily average in August and total output for the 31 days is placed at 16,434,418 bbls., an average of 530,143 bbls. per day. Despite the increase last month over July production is still below that for the same month in 1937 when August production aggregated 17,092,561 bbls.

Probably the outstanding feature in August production reports is the introduction of Bachaquero as a shipping field increasing the total number of pools in the country to 13. Bachaquero is immediately south of the Tia Juana field on Lake Maracaibo. Venezuelan Oil Concessions, subsidiary of Royal Dutch-Shell, discovered production in the Bachaquero field last year and outlined an aggressive development program for 1938. Due to conditions within the industry the program was modified and delayed until last month when first production was shipped from the field. Bachaquero is another typical Lake Maracaibo field producing low-gravity oil from comparatively shallow depths. An extensive system of dykes and drainage canals preceded the development program and the V.O.C. constructed a large electrical power station, roads, dwellings, machine shops, and other necessities for broad-scale exploration.

Venezuela Oil Concessions moved well into the leadership as the largest producer in Venezuela last month. Since the Mexican Eagle's properties in Mexico were confiscated last March the Royal Dutch-Shell subsidiary in Venezuela has been increasingly active and is producing nearly 800,000 bbls. per month more crude in Venezuela at the present time than in 1937. With shipments started from the Bachaquero field this margin of increase on the part of V.O.C. may be extended even more before the year ends. Production from the new Temblador field in eastern Venezuela continues to increase. The estimated Temblador output of 247,239 bbls. in August is about 67,758 bbls. greater than reported for July, an increase of about 2,000 bbls. in daily average yield. Production details follow:

VENEZUELA CRUDE PRODUCTION

(By fields)

	Aug., 1938	Aug., 1937	Daily av. Aug., 1938
Lagunillas	6,550,962	7,912,219	211,321
La Rosa	2,824,009	2,184,447	91,097
Tia Juana	2,497,391	2,576,798	80,561
Quiriquire	2,182,618	2,238,362	70,407
Mene Grande	1,079,955	1,282,130	34,837
Tarra	429,852	376,798	13,866
Temblador	247,239		7,976
Cumarebo	216,327	221,377	6,978
Pedernales	159,980	145,144	5,161
Lapaz	67,870	11,077	2,189
Concepcion	78,575	90,320	2,535
El Mene	51,711	54,281	1,668
Bachaquero	47,929		1,546
Total	16,434,418	17,092,561	530,142
Daily avg. Aug.,'37		551,373	
Total July, 1938		16,051,695	
Daily avg. July,'38		517,796	

(By companies)

Lago Pet. Corp.	4,678,255	5,777,226	150,911
Venezuela Oil Con.	5,058,196	4,292,446	163,168
Std. of Venezuela.	2,908,367	2,988,708	93,818
Mene Gnde. Oil Co.	2,174,000	2,266,000	70,129
Caribbean Pet. Co.	1,079,955	1,282,130	34,837
Colon Dev. Co.	429,852	376,406	13,866
British Controlled.	51,711	54,281	1,668
No. Venezuela Pet.	54,082	55,364	1,745
Total	16,434,418	17,092,561	530,142

Colombia and Peru Production Sees Little Change in August

Production trends in Colombia and Peru as indicated by output of the International Petroleum Co. and its subsidiary, Tropical Oil Co., remain unchanged for August. Production of Tropical in Colombia remains at a comfortable margin of increase over 1937 records while International's yield in Peru is substantially below levels set last year.

International produced 1,111,339 bbls. of crude in August compared to 1,115,046 bbls. in July, 1938. In August, 1937, International's production in Peru totaled 1,246,305 bbls. For the period, January to August, 1938, Peruvian production totaled 8,883,518 bbls., compared to 9,867,179 bbls. for the same period in 1937.

Production of 1,852,467 bbls. by Tropical Oil Co. in Colombia last month was higher by more than 250,000 bbls. than the aggregate of 1,592,592 bbls. produced in August, 1937. For the seven months, January to August, Tropical has produced 13,929,704 bbls. this year compared to 13,246,073 bbls. for the same period in 1937.

Czechoslovakian Oil Production 10,500 Barrels in July

Czechoslovakian production of crude oil in July amounted to 1,521 metric tons, or about 10,500 42-gallon barrels, representing a slight increase of 2.5 per cent as against 1,434 metric tons in June, 1938, but a decline of 9.7 per cent as compared with 1,684 tons in July, 1937. Production for the first seven months this year, however, has increased 10.3 per cent over the same period of 1937, the total output of crude petroleum being 11,092 metric tons and 10,058 metric tons, respectively, during the first seven months of 1938 and 1937.

Soviet Russia's Petroleum Exports on Down Grade

Petroleum exports from the U.S.S.R. continue to dwindle. During August, petroleum shipments from Russian Black Sea ports were less than half of their total for the same month last year. More than 80 per cent of the U.S.S.R. petroleum shipments through the Black Sea, the principal channel of export trade, consisted of heavy fuel oils and gasoline.

Petroleum shipments from the U.S.S.R. through Black Sea ports during July totaled 61,931 metric tons and of this total 34,508 tons were fuel oil. Great Britain remains the largest individual customer for U.S.S.R. petroleum exports, receiving a total of 16,953 tons in July, consisting of 9,833 tons of gasoline and 7,120 tons of fuel oil. Egypt, where U.S.S.R. products are blended and subjected to further refining as well as entering direct channels of consumption, received a total of 13,750 tons of fuel oil and gasoline during the month. Spain, which received 11,240 tons of fuel oil, was the third largest customer during the month.

During the first seven months of 1938, U.S.S.R. petroleum exports have amounted to less than a third of their 1937 level. There have been 394,211 tons of petroleum exported by the U.S.S.R. since January this year, compared to 1,106,907 tons for the same seven months in 1937, which in itself established a new low.

Production in Poland in June 41,607 Metric Tons of Oil

Polish production of crude oil in June, 1938, amounted to 41,607 metric tons. The price remained unchanged at 1,552 zlotys (about $295) per 10-ton tank of the most popular Borslaw brand.

There were 833 oil and gas wells operated in June employing 10,400 workmen and 36 new wells were opened during the month. The 27 refineries employing 3,367 workmen and the 29 gasoline plants employing 366 workmen manufactured 38,840 tons of crude into 35,461 tons of various derivatives and 151.6 tons of liquefied gas, a total of 35,612.6 tons, of which 3,491.8 tons were exported and 27,485.7 tons were consumed domestically.

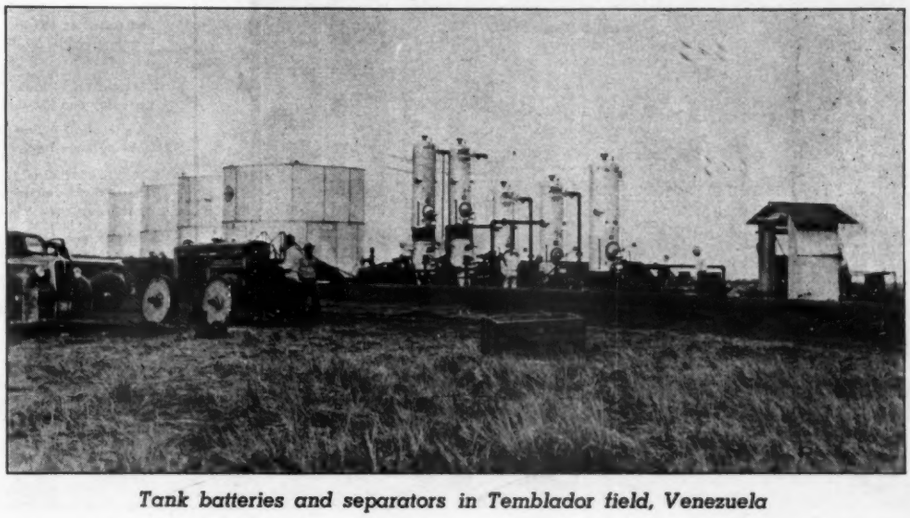
Production details follow (figures in metric tons):

Field—	Production	Used as fuel and shortage	Deliveries to refineries	Stocks at end of month
Jaslo	11,040	180	11,194	3,631
Drohobycz	26,959	1,378	25,438	13,657
Stanislawow	3,608	65	3,683	1,137
Total	41,607	1,623	40,315	18,425

Period—	Production	Deliveries—Domestic	Deliveries—Exports	Stocks at end of month
June, 1938	151.6	165.7	35.8	110.1
Jan.-June, 1938.	1,075.1	291.7	120.6	0

French Petroleum Exports Reduced This Year

French exports, which are largely marketed in Algeria, the United Kingdom, the Netherlands and to a much smaller extent in Belgium-Luxemburg and Switzerland, were reduced to 244,255 tons for the first half of 1938 from 367,488 tons in the same 1937 period. Gasoline exports were fairly constant, outbound shipments of lubricating oils were higher by 4,000 tons, but fuel oil, on the other hand, was lower by 148,000 tons.

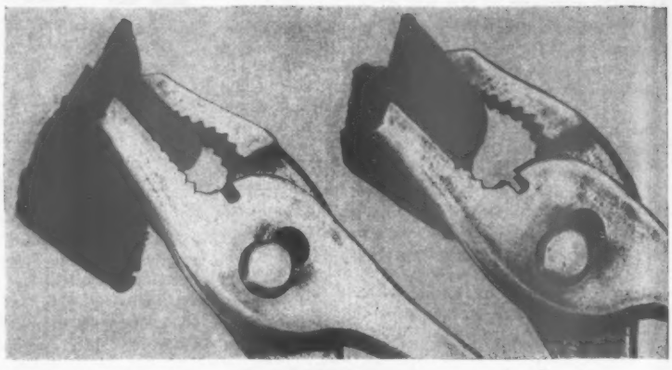


Tank batteries and separators in Temblador field, Venezuela

Make Your Pipe Joints

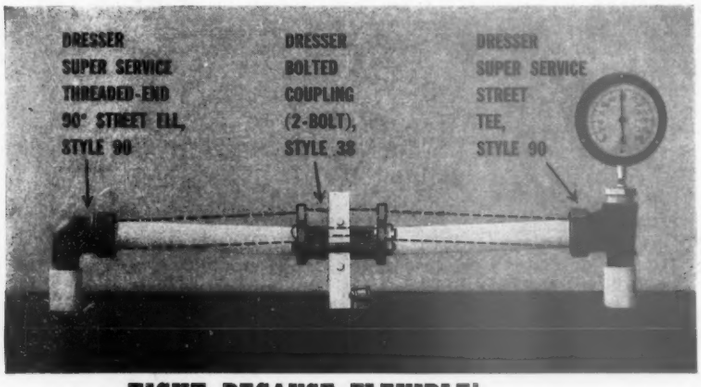
DRESSER PERMANENT TIGHTNESS PHOTO'D!

This old-style "Dresser" (installed 1903 and accidentally uncovered) typifies Dresser performance today on 150,000 miles of pipe. It is still serving continuously, with not one cent for maintenance. Says one user: *"Never a leak on your couplings and have installed thousands."*



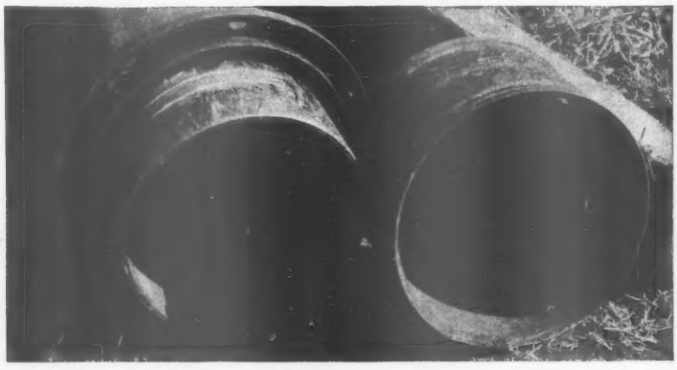
GASKETS LAST AS LONG AS PIPE!

Service conditions actually *preserve* Dresser gaskets—give them exceptional longevity. Like new is above old-style 12" gasket, 31 years old. Note 100% resilience when pliers are released. Continually tested, backed by 50 years' experience, Dresser gaskets are even better compounded now than ever.



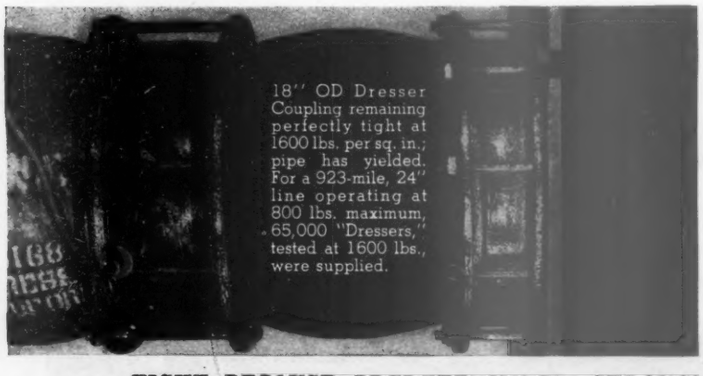
TIGHT BECAUSE FLEXIBLE!

A half-million "flexes" through 4° (see dotted lines), with no pressure drop—this test shows how Dresser time-proved flexibility safeguards and *insures* tightness by absorbing the harmful pipe movements (from frost, expansion, ground movements, vibration, etc.) that often cause rigid lines to fail.



TIGHT BECAUSE FOOL-PROOF!

Simple, *standard* "Dressers" can be *assembled* in only one way—permanently tight. *"Factory-built"* within *precise* limits under ideal conditions, *every* "Dresser" has a pre-assured, *uniform* fit and tightness. Uncertainties of field fabrication, the "human equation," and "variables" are out.


18" OD Dresser Coupling remaining perfectly tight at 1600 lbs. per sq. in.; pipe has yielded. For a 923-mile, 24" line operating at 800 lbs. maximum, 65,000 "Dressers," tested at 1600 lbs., were supplied.

TIGHT BECAUSE PREDETERMINED STRONG!

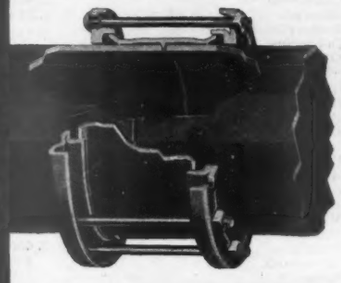
Dresser parts are mathematically varied in strength to meet safely any specified internal pressure—are "advance" engineered of high-strength materials, with ample, *identical* strength and durability at all points. Middle ring ("control" part) is always made at least as strong as pipe; followers are extra rigid, gaskets generous size, bolts special, threads rolled.

Typical Comments—Dresser Tightness	First . . . and Still Serving!				
	Date Laid	Location	Length of Line	Pipe Size	Service
"Tested 125 mi. and not a leak."	1891	Malta, O (original Dresser line)	5 mi.	5⅝" Cas.	Nat. Gas
"The 8-inch line has been finished and tested at 160 lbs. water pressure followed by 90 lbs. of air. No leaks."	1896	Zoar Gas Fields to Buffalo, N.Y.	8 mi.	12"	Nat. Gas
"Went out on 20" line. They tested yesterday and found no leaks."	1898	Pittsburgh, Pa.	15 mi.	16" 20" 24"	Nat. Gas
"Put a test on 16" line—400 lbs. No leaks developed on any joint."	1898	W. Vir. to N'th-eastern Ohio	80 mi.	10"	Nat. Gas
"Tested to 250 lbs., all Dresser Couplings and expansion joints showing up tight—no exceptions."	1902	Sugar Grove, Ohio, to Toledo, O	100 mi.	10"	Nat. Gas
"Maximum pressure 700 lbs. without a leak to date." (5½" OD oil line)					

TIGHT ON TEST—TIGHT FOR GOOD!

The Table, *left above*, gives typical users' reports on test results with Dressers. In some cases, builders *completely* backfill a Dresser-coupled line before testing. The Table, *right above*, lists lines first to be Dresser-coupled; they are still in active service today! Note Malta line, first Dresser installation, laid nearly 50 years ago, and requiring no attention since.

Permanently TIGHT!*



*TIGHTNESS ...YES! ALSO:

1. FLEXIBILITY—expansion, ground movements, vibration, lowering stresses, etc., are absorbed. Many curves, contours, etc., made with straight pipe.
2. SIMPLICITY—standard parts are assembled on plain-end pipe by unskilled labor, using only a wrench, under almost any weather or ditch conditions.
3. SPEED—typical examples: 3 min. for 4" size; 6 min. for 8"; 8 min. for 14"; 10 min. for 18"; 12 min. for 20" (two workmen).
4. STRENGTH—predetermined; joints safely withstand any specified pressure.
5. TRUE ECONOMY—a truly lower joint cost throughout life of line, plus salvage.

Dresser Insulating Couplings, Style 39, mitigate harmful electrolytic corrosion by insulating each pipe section and breaking up the flow of stray electrical currents. Working principle is same as shown in cut-away view above, except gaskets are made with wide insulating aprons extending along pipe. Sizes: ½" ID to 20" OD, incl. Further information furnished promptly upon request.

PIPE-LINE builders rightly have definite ideas about that first pipe-joint essential—tightness—both on test and for the life of the line. Especially with today's higher working pressures.

Why? Because joint efficiency usually controls pipe-line performance.

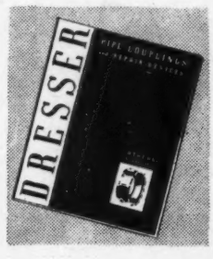
That's why it pays to choose joints whose tightness is proved by the one and only *certain* guarantee—*long-time* field performance.

Such joints largely end troublesome "unaccounted-for" leakage, maintenance, expensive repairs, revenue loss, possible property damage.

How well Dresser Couplings have proved their *inbuilt*, long-time tightness and sound basic design is today a matter of factual record.

For with Dresser Couplings, *testing* tight is only the start. Experience over the past 50 years shows they *remain* tight. No other joint today can offer an equivalent record of service! In fact, the "freezing" action between gaskets and pipe often makes "Dressers" even tighter with age.

Thus, when you install a Dresser-coupled line, you get not only gratifying test results quickly and easily, but also maximum assurance of trouble-free joint performance for the life of the line.



For further details, write for our General Catalog No. 36, a virtual handbook on pipe joints. —S. R. DRESSER MFG. CO., BRADFORD, PA. *New York:* 17 East 42nd Street; *Chicago:* Peoples Gas Building; *Houston:* Shell Building; *San Francisco:* 1038 Polk Street; *In Canada:* Dresser Mfg. Co., Ltd., 60 Front Street, West, Toronto, Ontario.

DRESSER
PIPE COUPLINGS

RICHEST MARKET

(Continued from Page 59)

be hardly more than started by completion of a main transmission line from an adequate source of supply in the Southwest to the Hudson River. That particular part of the program is comparatively simple, although it would meet the undivided opposition of the Pennsylvania and Illinois coal industries.

There is the further problem of franchise arrangements existing in the eastern cities, agreements between manufactured gas utility companies and municipalities which have been in existence longer than the natural gas industry. There are the further all-important financial links between manufactured gas utilities, the coal industry and the railroads. In no few instances the existing links are traceable back to the same interests which would be of necessity called upon to finance introduction of natural gas service to Philadelphia, Newark, New York and Boston. Still another obstacle is that many financial institutions deeply rooted in the manufactured gas utility, the coal and the railroad industries are equally firmly entrenched in the natural gas business.

The most eastern point in New York served with natural gas is Syracuse, which in addition to Rochester and Buffalo constitute the only large cities in the state now supplied.

Gas utilities have made relatively few steps toward expansion during recent years and there is no secret that caution has been the direct outgrowth of trends toward regulation in Washington and to a smaller extent in producing states. Predictions have been made by some authorities in the natural gas industry that business will be directed in all its essentials from a central bureau in Washington within 10 years, if present trends are continued and expanded. This opinion is not universally shared, but even those who minimize the present and future influence of government admit current trends must be reversed if the extremes in regulation are to be avoided.

The space for expansion of the natural gas industry rests chiefly in the industrial South, namely: North Carolina and South Carolina; in the densely populated East North Central states which include Illinois, Indiana, Michigan, Ohio and Wisconsin; in the Middle Atlantic states of New Jersey, New York and Pennsylvania and in the New England states of Massachusetts, Connecticut, Maine, New Hampshire, Rhode Island and Vermont.

The latest available figures showing data on the natural gas industry for June and for six months ending June 30 as compiled by the American Gas Association appear below:

	Month of June			Six months ending June 30		
	1938	1937	Per cent change	1938	1937	Per cent change
Customers:						
Domestic (incl. house heating)	6,451,100	6,290,900	+ 2.5			
Commercial	453,200	436,300	+ 3.9			
Industrial	35,700	36,100	— 1.1			
Miscellaneous	2,000	2,000	.....			
Total	6,942,000	6,765,300	+ 2.6			
Gas sales (M.C.F.):						
Domestic (incl. house heating)	19,648,000	18,693,700	+ 5.1	214,025,100	220,512,300	— 2.9
Commercial	4,859,200	4,760,700	+ 2.1	59,495,100	62,470,400	— 4.8
Industrial	43,243,100	54,205,100	—20.2	284,571,900	346,815,200	—17.9
Electric generation	13,600,100	15,477,100	—12.1	75,751,300	74,138,200	+ 2.2
Total Ind. and Elec. generation	*56,843,200*	*69,682,200*	*—18.4*	*360,323,200*	*420,953,400*	*—14.4*
Miscellaneous	1,146,800	1,357,600	.....	7,560,300	8,445,100	.....
Total	82,497,200	94,494,200	—12.7	641,403,700	712,381,200	—10.0
Revenue (dollars):						
Domestic (incl. house heating)	15,131,000	14,543,300	+ 4.0	144,239,600	146,233,100	— 1.4
Commercial	2,578,100	2,530,400	+ 1.9	27,721,600	28,479,200	— 2.7
Industrial and electric generation	9,187,800	11,475,200	—19.9	60,246,400	71,543,100	—15.8
Miscellaneous	172,300	184,500	.....	1,267,400	1,379,500	.....
Total	27,069,200	28,733,400	— 5.8	233,475,000	247,634,900	— 5.7

See June

Further evidence that the domestic consumer is the important revenue producer in the natural gas industry is shown by a decline of only 5.7 per cent in total revenue from all sales for the first half of this year while the total volume was down 10 per cent.

At the end of 1936, the United States had 179,660 miles of natural gas main and distribution lines while the manufactured gas industry operated 90,676 miles of lines. The distribution by states follows:

State—	Natural gas	Mfg. gas
Alabama	1,100	642
Arizona	330	37
Arkansas	3,290	13
California	22,480	136
Colorado	2,010	58
Connecticut	.....	2,681
Delaware	.....	396
District of Columbia	.....	848
Florida	60	2,072
Georgia	1,300	415
Idaho	.....	92
Illinois	1,760	10,610
Indiana	1,480	4,816
Iowa	1,730	1,928
Kansas	10,380	.....
Kentucky	2,950	70
Louisiana	3,060	.....
Maine	.....	441
Maryland	(*)	1,907
Massachusetts	.....	8,615
Michigan	3,600	5,387
Minnesota	400	2,106
Mississippi	1,410	.....
Missouri	5,020	1,936
Montana	1,950	29
Nebraska	2,210	591
Nevada	.....	88
New Hampshire	.....	449
New Jersey	.....	8,534
New Mexico	840	.....
New York	3,150	14,154
North Carolina	.....	475
North Dakota	410	140
Ohio	38,720	1,113
Oklahoma	9,810	.....
Oregon	.....	2,483
Pennsylvania	20,280	6,916
Rhode Island	.....	1,146
South Carolina	.....	475
South Dakota	210	118
Tennessee	940	822
Texas	27,700	.....
Utah	880	57
Vermont	.....	198
Virginia	(*)	1,489
Washington	110	1,909
West Virginia	8,720	58
Wisconsin	.....	4.227
Wyoming	1,370	.....
Total	179,660	90,676

*Included in Ohio.

STATUS OF GAS FUEL INDUSTRY

State—	Population served		Total population census of 1930	Natural gas customers	Manufactured gas customers	Natural gas sales (M.C.F.)	Manufactured gas sales (M.C.F.)
	Natural gas	Manufactured gas					
Alabama	304,100	367,300	2,646,248	27,740	42,050	14,889,500	5,032,900
Arizona	106,000	16,600	435,573	20,500	2,040	1,538,800	55,700
Arkansas	410,000	8,300	1,854,482	71,750	580	25,674,100	19,000
California	5,363,300	34,400	5,677,251	1,547,310	6,200	174,020,900	183,600
Colorado	565,300	33,400	1,035,791	98,310	2,930	19,140,000	65,200
Connecticut	.....	1,400,700	1,606,903	.....	291,310	.....	9,864,900
Delaware	.....	171,000	238,380	.....	33,680	.....	1,483,700
District of Columbia	.....	550,000	550,000	.....	144,540	.....	8,908,300
Florida	31,500	638,700	1,468,211	3,720	93,740	1,004,100	2,594,700
Georgia	709,300	331,600	2,908,506	75,170	25,150	11,545,300	837,100
Idaho	.....	51,500	445,032	.....	3,660	.....	110,100
Illinois	433,600	5,579,400	7,630,654	90,070	1,266,740	49,964,900	45,432,000
Indiana	252,600	1,698,700	3,238,503	40,660	323,040	6,206,000	13,210,700
Iowa	282,900	702,500	2,470,939	55,180	138,820	19,801,300	4,466,500
Kansas	1,163,500	.....	1,880,999	215,620	.....	63,702,700	.....
Kentucky	915,500	147,200	2,614,589	173,640	4,000	13,088,000	129,000
Louisiana	1,012,600	.....	2,101,593	169,840	.....	119,879,400	.....
Maine	.....	480,800	797,423	.....	37,410	.....	1,149,100
Maryland	63,000	1,161,100	1,631,526	14,790	237,280	655,200	13,589,500
Massachusetts	.....	4,038,300	4,249,614	.....	818,960	.....	25,517,900
Michigan	1,930,700	1,599,100	4,842,325	461,220	264,880	23,036,300	10,507,600
Minnesota	88,900	1,107,200	2,563,953	14,000	244,370	8,170,000	8,222,000
Mississippi	381,300	.....	2,009,821	44,630	.....	11,916,800	.....
Missouri	860,000	1,161,100	3,629,367	161,200	241,590	35,068,000	7,541,400
Montana	194,400	16,000	537,606	45,010	1,060	21,190,900	28,000
Nebraska	591,800	246,700	1,377,963	62,660	56,850	14,455,100	2,847,100
Nevada	.....	35,000	91,058	.....	3,000	.....	87,100
New Hampshire	.....	231,400	465,293	.....	33,190	.....	1,009,200
New Jersey	.....	3,964,900	4,041,334	.....	904,090	.....	28,749,400
New Mexico	86,000	.....	423,317	16,490	.....	5,094,500	.....
New York	1,654,300	11,099,700	12,588,066	334,450	2,669,090	52,137,900	85,523,400
North Carolina	.....	697,100	3,170,276	.....	43,530	.....	1,519,900
North Dakota	35,100	82,800	680,845	4,990	12,180	1,565,100	296,500
Ohio	4,961,400	232,100	6,646,697	1,230,520	40,710	124,991,100	1,184,000
Oklahoma	1,241,600	.....	2,396,040	254,120	.....	64,572,100	.....
Oregon	.....	636,800	953,786	.....	87,030	.....	3,311,600
Pennsylvania	4,289,600	4,690,700	9,631,350	665,410	873,250	97,385,100	31,461,600
Rhode Island	.....	625,100	687,497	.....	122,690	.....	4,419,600
South Carolina	.....	293,600	1,738,765	.....	24,750	.....	911,500
South Dakota	66,100	54,900	692,849	14,990	8,430	5,415,800	222,900
Tennessee	306,400	457,000	2,616,556	43,650	34,860	7,658,500	1,593,200
Texas	3,164,200	.....	5,824,715	607,270	.....	175,030,200	.....
Utah	240,300	22,000	507,847	23,760	1,150	10,888,300	285,000
Vermont	.....	106,800	359,611	.....	18,320	.....	379,700
Virginia	45,000	808,700	2,421,851	5,950	113,420	353,500	3,863,200
Washington	10,000	790,400	1,563,396	1,130	71,600	208,000	2,837,100
West Virginia	802,200	35,000	1,729,205	184,180	3,620	42,228,700	93,600
Wisconsin	.....	1,720,800	2,939,006	.....	358,080	.....	13,717,300
Wyoming	104,600	.....	225,565	21,430	.....	8,170,900	.....
Total	32,667,100	48,126,400	122,838,177	6,801,360	9,703,870	1,230,645,000	343,261,800

Note: Data on population served, customers and gas sales is as of December 31, 1936. Data derived from annual reports of American Gas Association.

QUESTIONS ON TECHNOLOGY

By Charles K. Francis, Ph. D., Technical Editor

Ethylene Glycol For Removal of Moisture From Natural Gas

Could you give me any information covering the use of ethylene glycol for the dehydration of natural gas?—L. J.

Ethylene glycol is especially well suited for drying natural gas, because it is extremely hygroscopic, absorbing about twice its weight of water. The boiling point is so high, 387° F., that the absorbed water is readily separated upon heating to the boiling point of water and the ethylene glycol recovered. It has but a slight order, giving off no objectionable vapors to contaminate a gas and has no corrosive action on metals.

Ethylene glycol is well known as an antifreeze agent for the preparation of the circulating solution for cooling the automobile engine during the winter season. It has the advantage of lowering the freezing point of water more than an equal volume of water. This property permits the saturated solution to be handled in the plant operations without danger of freezing.

The bubble plate tower so widely applied for the fractionation of petroleum liquids is also adapted to drying natural gas. The gas flows upward while the ethylene glycol descends from plate to plate, accumulating water and is withdrawn at the bottom. From the bubble tower the water-saturated glycol passes to a still, where the water is removed. The glycol is then cooled and returned to the absorbing system.

The inspection includes determinations of the water content of the gas, the water-saturated glycol and the recovered glycol. Gravity and boiling point determinations are also made at frequent intervals.

The properties of ethylene glycol were given in The Oil and Gas Journal, January 27, 1938, this department.

Removing Hydrogen Sulfide From Natural Gas With Caustic Soda

We consume about 25,000 cubic feet of natural gas each day which contains 437 grains of hydrogen sulfide per 100 cubic feet doing considerable damage to the engine. We clean this gas now with caustic soda, but it requires about 100 pounds a day and this is too costly. Do you have any information on this subject?—D. F.

The quantity of hydrogen sulfide that may be removed from a natural gas depends on two possible reactions, provided the mechanical conditions are adequate, which are:

(1) $NaOH + H_2S = NaHS + H_2O$
40 34 56

(2) $2NaOH + H_2S = Na_2S + 2H_2O$
80 34 78

Reaction No. 1 indicates 40 pounds, the molecular weight in pounds, of sodium hydroxide will unite with 34 pounds of hydrogen sulfide to form 56 pounds of sodium hydrogen sulfide. However, if the contact is sufficient to saturate the sodium hydroxide, the sodium sulfide will be formed. This is illustrated in Equation 2, where 80 pounds of sodium hydroxide unites with the hydrogen sulfide to produce 78 pounds of sodium sulfide.

Treating 25,000 cubic feet of gas containing 437 grains per 100 cubic feet means that about 15.6 pounds of sulfur is to be handled. This should be done with approximately 17 pounds of sodium hydroxide.

Hydrogen sulfide is soluble to the extent of over four parts to one part cold water. Hence, when cold water is available it should be used for extracting hydrogen sulfide ahead of any chemical.

The operation of removing hydrogen sulfide from natural gas should be under the supervision of a competent chemist.

Natural Gas Supply Contains Corrosive Substances

Soon after a new supply of gas was added to our system corrosion of pipes and meters, especially parts containing brass and copper, became noticeable. Leather gaskets rapidly deteriorated. Analyses show large quantities of oxygen and nitrogen in this gas. Water from the wells contains calcium and sodium chlorides, reacting acid. The gas has a sweetish odor which may be sulfur dioxide. Have you encountered any similar conditions elsewhere?—R. J. C.

It may be that the deterioration of the leather is due to either of one of two things, possibly both. The hydrocarbons tend to dry leather and acids to decompose it.

The chlorides of oil well waters hydrolyze to form hydrochloric acid which may be carried in gas and thus account for the corrosion. If the gas at the wells contains hydrogen sulfide, it is possible through the introduction of air to convert it to sulfur dioxide. However, I do not have an opinion covering the origin of the sweetish odor other than the possible traces of certain hydrocarbons that may be present.

Hydrochloric acid is often formed in refineries but I have had no previous instance of its possible presence in natural gas. Most of the corrosion due to natural gas itself has been explained by the presence of hydrogen sulfide.

CHEMICALS FOR THE PETROLEUM INDUSTRY

Ferric Chloride

Use—Water purification, oil well mud fluid.

Form—Brownish yellow deliquescent crystalline solid.

Formula—$FeCl_3.6H_2O$.

Molecular weight—270.31.

Melting point—98.6° F.

Boiling point—536° F.

Solubility—Cold water 246 parts per 100.

LIMITATIONS

Purity, per cent	99
Insoluble, max., per cent	0.01
Acid as HCl, max., per cent	0.12

Note. Should be stored in cool place in tight containers away from light.

Kogasin and Fisher's Synthesis of Motor Fuel From Water Gas

What is "Kogasin"? I am confused because this product is described as a lubricating oil on page 50, The Oil and Gas Journal, issue of July 21, 1938, in the article by A. H. Nissan, and I have a recollection of seeing it mentioned before as a kind of gasoline. Your explanation will be appreciated.—E. T. S.

Several scientists have been at work for some years, especially in Europe, endeavoring to devise commercial methods for the synthesis of motor fuel. Fisher and his associates have found that the product of the interaction of hydrogen and carbon monoxide could be converted into hydrocarbons, the combination yielding products designated Kogasin.

These may be called Kogasin petrol (gasoline), Kogasin Diesel oil, or Kogasin lubricating oil, according to the characteristics of the substances formed. Gasoline is a primary product and lubricating oil a secondary product formed by the polymerization of the olefines.

The second part of the Nissan article, which appeared in The Oil and Gas Journal, July 28, 1938, gives considerable detail about this process. C. Berthelot also gives information about the Fisher products.

A water gas containing 2.9 per cent carbon monoxide and 58 per cent hydrogen, heated at 374° F. at atmospheric pressure in the presence of cobalt, yielded the products as shown in the table.

WATER GAS PRODUCTS

Product—	Per cent (weight)	Volume per cent olefines in fraction
"Gasoil"	4	50
"Benzine"	62	30
Soft wax	7	..
Hard wax	4	..

Lubricating oil may be produced from the olefines by various methods, usually following the Friedel and Craft's reaction.

The motor fuel, a fraction at 302° F., has these properties:

Gravity, A.P.I.	73.3
Sulfur per cent	0.1
Vapor pressure (R)	6.5
Gum, mgm./100 cc. (glass)	2.0
Olefines, per cent vol.	70.0
Octane number	68

The properties of two lubricating oils are given here, as examples, produced from the 302° to 392° F. fraction.

KOGASIN LUBRICATING OILS

	A	B
Gravity, A.P.I.	35.7	33.4
Flash, closed, °F.	375	455
Viscosity, Redwood, sec.:		
70° F.	289	1,884
100° F.	129	660
210° F.	39	66
Viscosity index	+100	+94
Pour, °F.	...	32

Additional details may be obtained from the references.

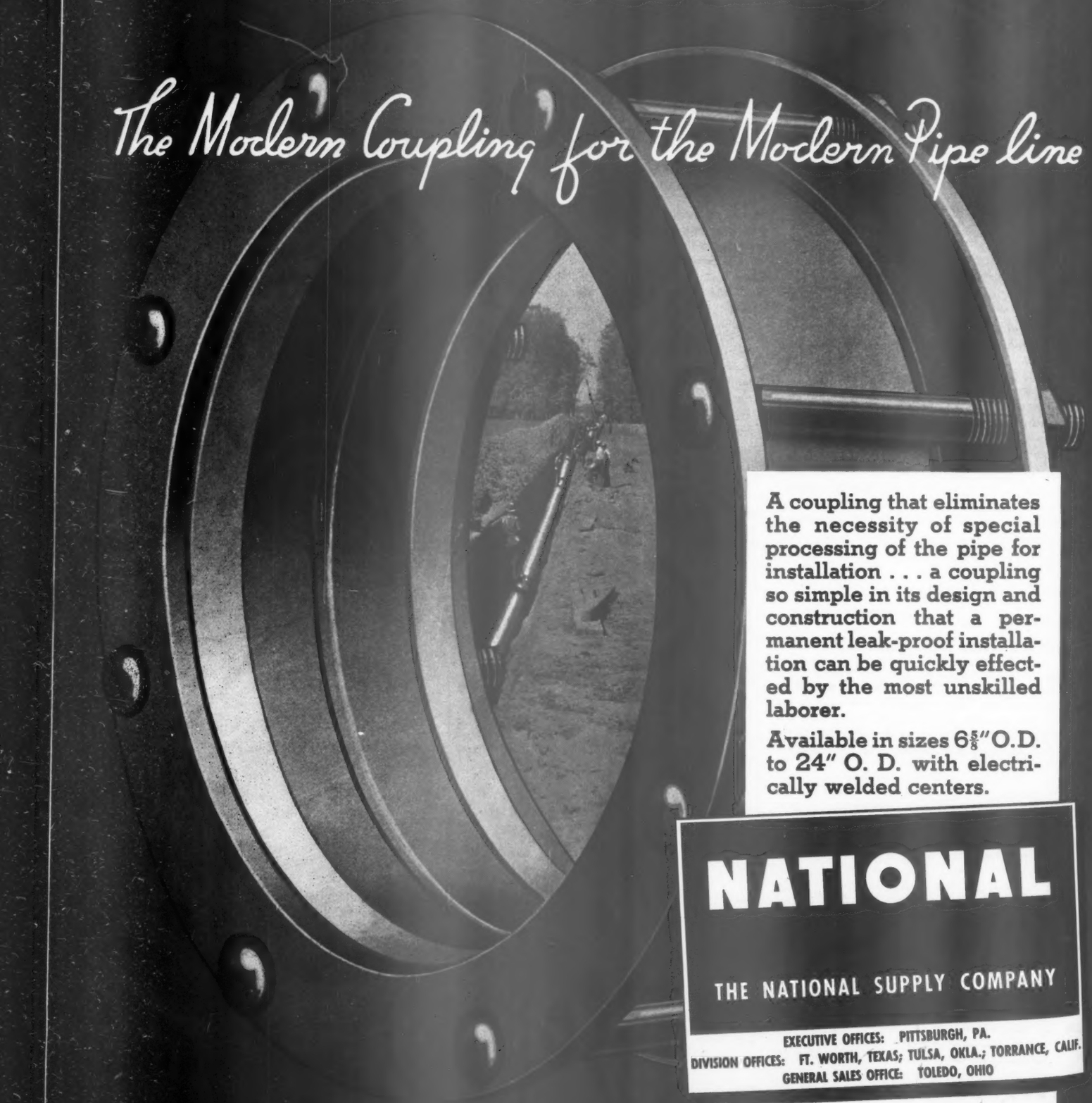
References: Nissan, The Oil and Gas Journal, July 21, 1938, page 49. Nissan, The Oil and Gas Journal, July 28, 1938, page 89. C. Berthelot, Chimie et Indust., 37, 211, 1937.

Questions on Petroleum Technology may be sent to Dr. Charles K. Francis, The Oil and Gas Journal, Tulsa, Okla. When a copy of the answer is desired, postage should be enclosed.

DAYTON

NO. 1 COUPLING

The Modern Coupling for the Modern Pipe line



A coupling that eliminates the necessity of special processing of the pipe for installation . . . a coupling so simple in its design and construction that a permanent leak-proof installation can be quickly effected by the most unskilled laborer.

Available in sizes 6⅝" O.D. to 24" O. D. with electrically welded centers.

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THE NATIONAL SUPPLY COMPANY

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GENERAL SALES OFFICE: TOLEDO, OHIO

PROBLEMS FROM READERS

Edited by L. G. E. Bignell

Correction in Volume of Oil For Temperature Change

Will you kindly give us a simple rule for correcting volume of oil either up or down to 60 degrees temperature? To illustrate: If our pipe line run ticket shows 500 bbls. of oil at 98° temperature and we must report the volume to the Conservation Department at 60° F. how can we make this calculation?—P. P. C.

Replying to your letter asking about rule for computing volume change in oil to correspond with temperature changes, we find in northern Louisiana it is customary to use the empirical rule of changing volume 1 per cent for each 20° temperature change. On the Gulf Coast of Louisiana and in all of Texas the rule is 1 per cent volume change for every 25° temperature change. In Texas this custom has been made the basis for Rule 9 issued by the Texas Railroad Commission.

In Oklahoma and Kansas there is no correction made for temperature change except when the oil has been artificially heated. If the oil has been steamed it is customary to correct on the basis of 1 per cent volume for each 20° temperature change based upon the difference between the temperature of the oil and the temperature of the atmosphere.

In the Rocky Mountain states and on Federal land in New Mexico the table given originally in U. S. Bureau of Standards Bulletin No. 154, lately reissued as Bulletin C-410 without change in the temperature correction tables, is used for corrections. On land other than Federal leases in New Mexico the rule is to correct 1 per cent by volume for every 25° temperature change as in Texas.

Applying the custom in northern Louisiana to your specific problem: The difference between the observed temperature of 98° and 60° is 38°. Divided by 20° equals 1.9 per cent change. Multiplying 500 bbls. x 1.9 equals 9.5 bbls. to be deducted making the net volume of the oil 490.5 bbls.

Water Coning

Can you refer me to any sources of information on the causes of and cures for "water coning"?—E. L. W.

If you can find a copy of U. S. Bureau of Mines Bulletin No. 284, "Production and Development Problems in the Powell Oil Field, Navarro County, Texas," by H. B. Hill and Chase E. Sutton, you will have a complete explanation of water coning and some suggestions as to how this water movement may be controlled.

In general the best way to control the movement of water through the producing formation is by back pressuring. That is enough pressure is held against the face of the formation to keep the oil to some degree compressed between the pressure at the face of the hole and pressure back in the formation at water-oil contact. In this way the water is made to do work in moving the oil into the well.

It is also good practice not to drill wells very deep into producing formations where there is water beneath the oil.

The rate of production of the gas and oil is also an important factor in control of water coning and this is accomplished by the regulation of back pressure.

If the gas and oil flows into the well without control there is a tendency to relieve the water pressure below the oil and the water is forced upward and toward the well bore and being heavier than the oil will crowd into the space immediately around the bottom of the hole and cut off the entrance of the oil to the well.

Use of Kick-Off Valves With Gas-Lift

Would you advise me where I can obtain information on the operation of flow valves or kick-off valves in the flowing of oil wells?

I am interested in determining the gas volume and pressure necessary to flow wells from 3,000 to 4,000 feet deep. Gravity of the oil is 40 degrees A.P.I. or better.—B. D.

For information about flow valves or kick-off collars it is suggested you write to the several manufacturers of such devices who advertise in The Oil and Gas Journal. They will be glad to assist you in solving your problem if you will give them additional information.

The following is taken from Practical Petrolem Engineers' Handbook on Kick-Off Valves. "To eliminate excessive starting pressure in gas lift operations numerous devices are being used which by starting the well in stages reduce the starting pressure to practically the operating pressure. These devices, so-called kick-off valves, are practically all operated on the same principle. They open when the difference in pressure between the up and down stream side of the valve exceeds the predetermined pressure, and they close when the difference decreases below this value. One of the two unknown quantities, the spacing of collars and the pressure necessary to lift the fluid above the collar, can be calculated from the formula:

$$P = S\ W\ (1 + \frac{A_1}{A_2})$$ where

P = Pressure in pounds per square inch required to flow the fluid above the collar.
S = Distance between collars in feet.
W = Pressure in pounds per square inch necessary to sustain column of fluid 1 foot high.
A_1 = Area of the inlet in square inches.
A_2 = Area of the outlet in square inches.

"For example if it is assumed:

Well depth: 4,500 feet with tubing on bottom.
Casing: 7-inch.
Tubing: 2½-inch.
Fluid level: 1,500 feet.
Collar spacing: 250 feet.

"The area of the annular space would be 24.4 square inches, that of the tubing 4.67 square inches. If the well is to be flowed through tubing 10 collars will be required. The pressure to start the fluid above the first collar will be

$$P = 250 \times .35\ (1 + \frac{24.4}{4.67}) = 545 \text{ pounds.}$$

"If the well is to be flowed with the same pressure through the annular space, then the spacing of collars would be as follows:

$$S = 545 \times .35\ (1 + \frac{4.67}{24.4}) = 1{,}302 \text{ feet.}$$

"The first collar would then be located at 1,302 feet from the top of the well. Only two valves would be required."

Sampling Natural Gas Well

We have recently drilled three structures and found natural gas in each and believe upon development sufficient gas can be made available to make these fields commercial producers. However, they are located outside of the United States and facilities for testing the gas are meager and the market for the products is limited. It would therefore require a full study of the entire situation to determine what can best be done with this gas. Will you please advise me how we should go about preparing samples to be sent to a laboratory and what kind of a report could the laboratory be expected to make. Could we secure an estimate of costs as well as recommendation as to the type plant needed?—O. S. L.

It is suggested you secure two types of samples. The first, known as the "charcoal" test, is secured by passing a measured volume of natural gas from the well through a sample tube filled with activated charcoal. The second test consists of filling carboys with gas and shipping them to the laboratory for analysis.

To conduct the charcoal test you will need several tin tubes about 1⅝ inches in diameter by 7½ inches long. A fine mesh screen is inserted in one end of this tube and each end is provided with a threaded connection and cap. To manipulate this sampling device first fill the tube with activated charcoal broken into pieces from 6- to 14-mesh in size. Pack this material into the tube fairly tight and seal the ends by screwing on the caps.

The next step is to secure a test meter which can be connected with the source of the gas to be tested, in this instance, with the well. A rubber hose is usually provided as the connection between source of gas and the meter. When this connection is made the sample tube is screwed into an adaptor on the outlet side of the meter. The tube is placed with the screen-closed end downward and the top cap is removed so the gas may have free flow through the activated charcoal with which the tube is packed. When everything is in readiness the valve on the inlet side of the meter is opened and a measured volume of gas is passed through the meter and through the sample tube. This volume may vary from 10 to 30 cubic feet but whatever the volume it must be carefully recorded because the test in the laboratory will depend upon the accuracy of this record for final accuracy in the determination of natural gasoline content of the gas.

When the test is completed the sample tube is removed from the meter and the caps screwed on each end and the sample is packed in a dry container and shipped to the laboratory.

The sample packed in pressure cylinders or carboys can be taken by connecting the gas line from the well to the vessel and filling it with gas being certain that all air has been displaced from the vessel before the sampling is completed. When the pressure vessel is filled it should be sealed and shipped to the laboratory. Tests will be made on this gas sample to determine characteristics and hydrocarbon constituents. From such data it may be possible to determine whether the gas is best suited for the manufacture of natural gasoline, carbon black or dry ice.

Samples should be carefully packed and marked for identification before shipping to laboratory.

"SETTING THE PACE" I

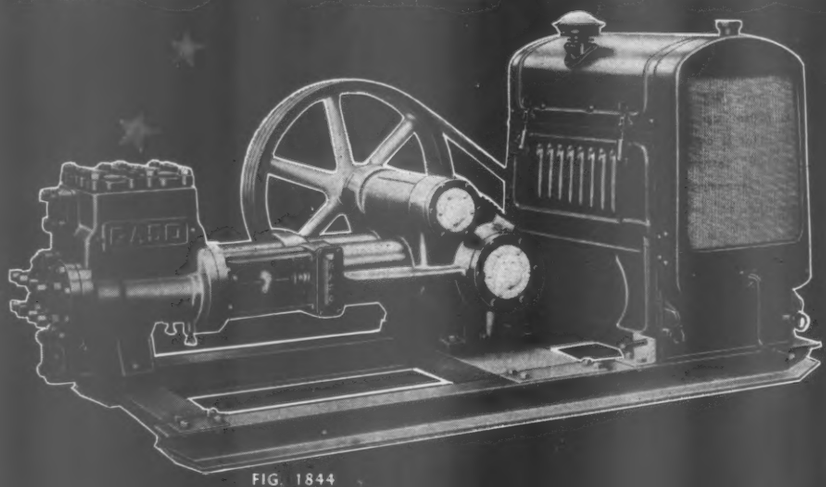


FIG. 1844
Gaso Duplex Piston
Timken Bearing Pump,
Gasoline Engine
Drive—46 to 288 Bbls.

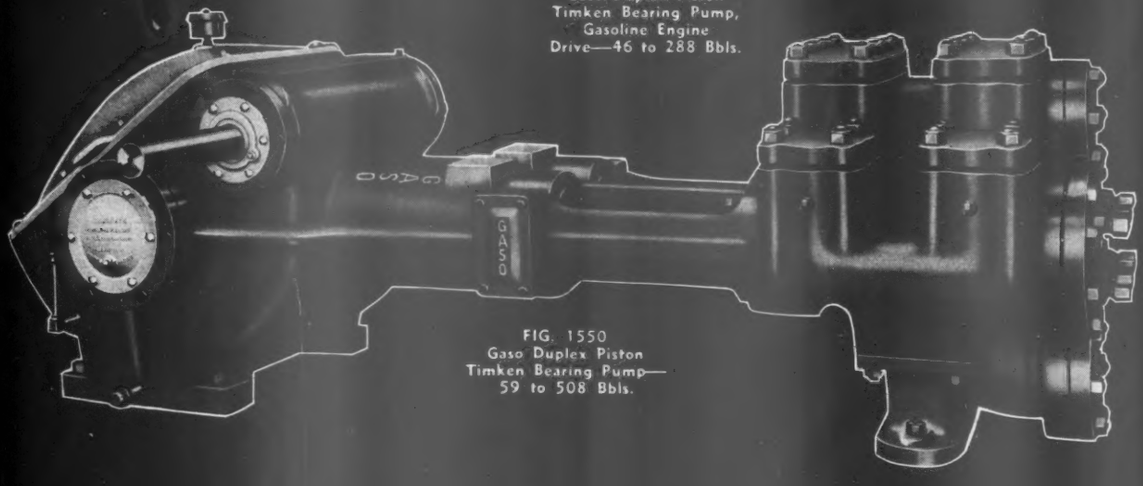
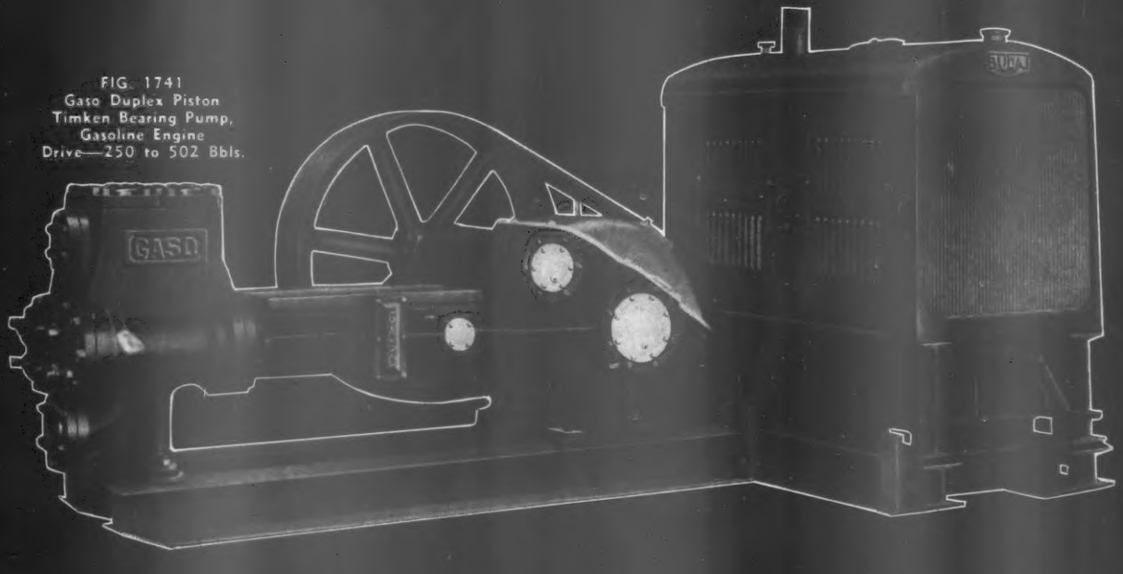
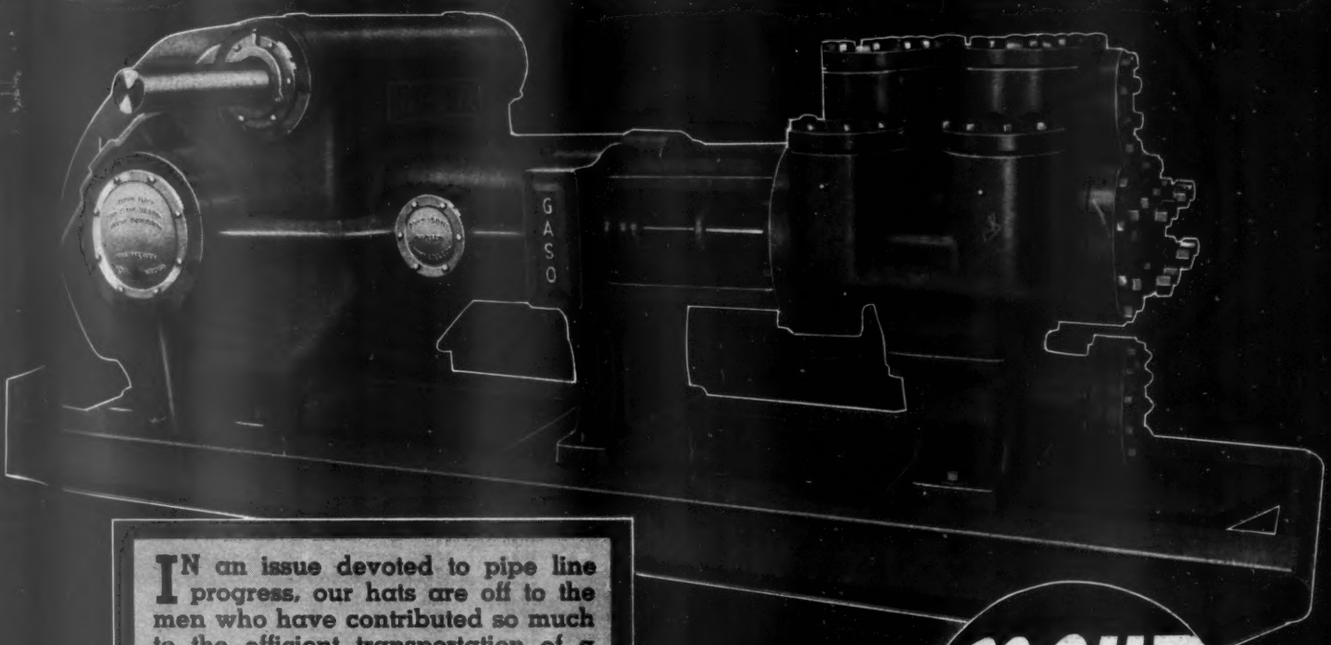


FIG. 1550
Gaso Duplex Piston
Timken Bearing Pump—
59 to 508 Bbls.

FIG. 1741
Gaso Duplex Piston
Timken Bearing Pump,
Gasoline Engine
Drive—250 to 502 Bbls.



IN PIPE LINE PUMPS



IN an issue devoted to pipe line progress, our hats are off to the men who have contributed so much to the efficient transportation of a vital product.

We salute you for your unbroken record of accomplishment—and we are proud to have had the opportunity to cooperate.

Dedicated to oil-industry service, we have made it our business to keep abreast of your progress—to maintain the Gaso policy of alert and honest service—and, most important, to meet every new pump need as it develops. And we have found ample reward in your recognition as the first source of supply in the field of pipe line pumps.

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new

FIG. 2652—12" stroke—designed to pump oil and water through long lines at pressures from 500 to 1500 lbs. at capacities of 592 to 176 Bbls. May be arranged for any type drive.

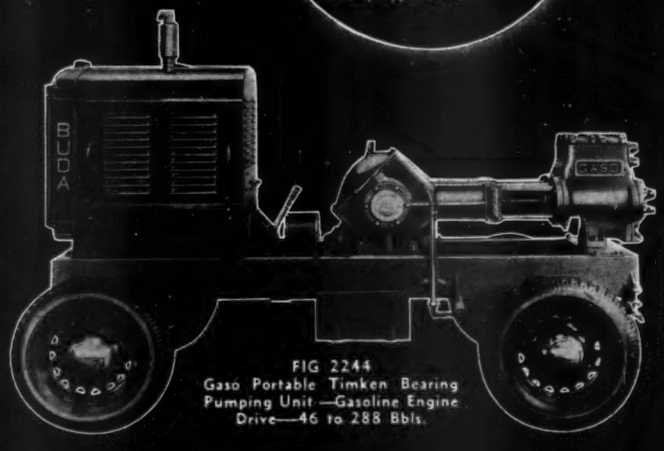


FIG 2244
Gaso Portable Timken Bearing Pumping Unit—Gasoline Engine Drive—46 to 288 Bbls.

GASO PUMPS

GASOLINE AND THE CONSUMER

By Joseph E. Pogue
Vice President, Chase National Bank, New York*

One of the most important criteria of the efficiency of an industry is the adequacy of the service it renders to the consumer. The problem of measuring this factor is involved, but in the case of the American petroleum industry it may be simplified by confining one's attention to gasoline, the principal product of petroleum and practically the sole source of energy for the automotive industry. To this end a factual study has been made covering the key statistics available that reflect the relationship of the commodity to the consumer.[1] The period of the past 15 years forms the time background, and the term gasoline is used interchangeably with motor fuel, although the latter word is technically the more correct.

Rate of Consumption

The first question to raise is: Has the supply been adequate? The answer may be found, at least in large part, in the rate at which the consumer has expanded his usage, both in the absolute and relative sense. We may accordingly observe, for the period 1923 to 1937, the actual consumption of motor fuel, its average consumption per motor vehicle in use, and the relationship of domestic motor-fuel consumption to the Federal Reserve Board index of industrial production. The data are presented in Table 1.

Reference to Table 1 indicates that in the past 15 years the domestic consumption of gasoline has increased approximately 3⅓-fold. In the same period, the consumption per motor vehicle has expanded from 394 gallons in 1923 to 655 gallons in 1937, or 66 per cent. In no year of this period has the consumption per motor vehicle retrogressed from the previous year, with two nominal exceptions: 1928 when this figure dropped 3 gallons, and 1932 when a decline of 5 gallons was witnessed. Taking the period of 1923-1925 as a base and calling it 100, we find that domestic gasoline consumption in 1937 stood at 272, whereas the Federal Reserve Board index of industrial production, related to the same base, registered 110. Thus, not only has gasoline consumption enjoyed a remarkable growth per se, but the increase has been striking relative to the number of motor vehicles in use as well as to the course of industrial activity. The consumer has found no difficulty in progressively augmenting his utilization of gasoline at a pace far exceeding the secular expansion of general business or even that of the automotive industry itself.

Quality of Gasoline

The gasoline available to the motorist has been increasing in utility from an engineering standpoint over the past 15 years. This improvement has been in part due to the development of a better gasoline by refiners and in part to improvements in engine design by automotive engineers. The major portion of the advance in quality has been marked by a step by step cooperative adjustment of motor fuels to engines and engines to motor fuels, tending always to greater over-all efficiency. The complexity of gasoline and the varying conditions under which it is used make simple measurement of its suitability difficult at any time, while the changes in engine design and the character of gasoline have been so great that no single index of quality can be used over the period.

Partial and descriptive evidence of the improvements in motor fuel, however, can be determined from the data available. Gasoline is produced by a number of processes, each with its special advantage. The increasing efficiency of automobile engines has largely been due to raising the compression ratio; which makes necessary the use of a fuel that has a higher octane rating, or a lower tendency to knock or detonate in the motor. Cracked gasoline, reformed gasoline, natural gasoline, benzol, and polymerized gasoline generally have higher octane ratings than straightrun gasoline. Thus the proportion of these components in the total supply of motor fuel offers a fairly satisfactory index of quality for the entire period under review. Likewise, for the latter part of the period, the development of the octane rating test provides a still more accurate index of quality, especially in view of the increasing employment of tetraethyl lead in commercial motor fuel. A summary of these measures of the progressive changes in the utility and quality of gasoline is presented in Table 2. It may thus be observed that the percentage of high-octane components in our total motor-fuel supply has increased from 34.6 in 1925 to 56.0 in 1937, while the average octane rating of the regular grade of gasoline has improved from 60 in 1931 to 70 in 1937, with indications that this factor will average 72 in 1938.

It is thus apparent that the consumer has enjoyed a steadily and improving quality in the motor fuel made available for his use.

The average retail price of gasoline (excluding sales tax) in 50 representative cities in the United

(Continued on Page 184)

TABLE 2—INDEXES OF QUALITY OF MOTOR FUEL IN THE UNITED STATES BY YEARS, 1923-1937

Year—	Per cent of high octane constituents of motor fuel produced*	Average octane rating of standard grade gasoline consumed† (Octane number)	Average octane rating of premium grade gasoline consumed† (Octane number)
1923	...	..	..
1924	....	..	..
1925	34.6	..	..
1926	41.1		
1927	41.0	..	..
1928	42.5	..	..
1929	44.3	..	..
1930	49.0	..	..
1931	49.8	60	72
1932	51.1	61	74
1933	52.0	63	76
1934	51.3	69	75
1935	53.2	69	75
1936	55.2	69	76
1937	56.0	70	77

*Computed from data of the U. S. Bureau of Mines, "Petroleum Refinery Statistics," for several years.
†Per K. Frolich, "Chemical Trends in the Petroleum Industry," Industrial and Engineering Chemistry, August 1938, p. 919.

TABLE 1—ACTUAL AND RELATIVE CONSUMPTION OF MOTOR FUEL BY YEARS, 1923-1937

Year—	Domestic consumption of motor fuel* Mill. bbls.	Domestic consumption of motor fuel* Index Nos. 1923-25=100	Average domestic consumption of motor fuel per motor vehicle† Gallons	Average domestic consumption of motor fuel per motor vehicle† Index Nos. 1923-25=100	Federal Reserve Board index of industrial production‡ 1923-25=100
1923	158.7	83.2	394	98.3	101
1924	187.0	98.1	401	100.0	95
1925	226.3	118.7	408	101.7	104
1926	264.4	138.7	451	112.5	108
1927	299.8	157.2	457	114.0	106
1928	332.0	174.1	454	113.2	111
1929	376.0	197.2	506	126.2	119
1930	394.8	207.1	556	138.7	96
1931	403.4	211.6	596	148.6	81
1932	373.9	196.1	591	147.4	64
1933	377.0	197.7	597	148.9	76
1934	410.3	215.2	620	154.6	79
1935	434.8	228.0	624	155.6	90
1936	481.6	252.6	641	159.9	105
1937	518.8	272.1	655	163.3	110

*Reports of the U. S. Bureau of Mines, "Petroleum Refinery Statistics," for several years.
†American Petroleum Industries Committee, Taxation Bulletin, Vol. 3, No. 4, June 1938, p. 35.
‡Survey of Current Business.

TABLE 3—ACTUAL AND RELATIVE AVERAGE RETAIL PRICE OF GASOLINE IN 50 REPRESENTATIVE CITIES BY YEARS, 1923-1937, TOGETHER WITH COMPARATIVE DATA

Year—	Average retail price in 50 representative cities (ex-tax)* Cents per gal.	Average retail price in 50 representative cities (ex-tax)* Index Nos. 1926=100	Average annual sales tax in same 50 representative cities† Cents per gal.	Average annual sales tax in same 50 representative cities† Dollars per motor vehicle*	Price index of 784 commodities at wholesale‡ 1926=100	Purchasing power at 784 commodities over gasoline§ 1926=100
1923	21.06	100.4	0.91	4.37	100.6	100.2
1924	19.47	92.8	1.48	8.22	98.1	105.7
1925	20.09	95.8	2.11	9.51	103.5	108.0
1926	20.97	100.0	2.41	11.95	100.0	100.0
1927	19.29	87.2	2.80	13.48	95.4	109.4
1928	17.90	85.4	3.04	14.39	96.7	113.2
1929	17.92	85.5	3.50	17.71	95.3	111.5
1930	16.17	77.1	3.78	21.02	86.4	112.1
1931	13.00	62.0	4.00	23.84	73.0	117.7
1932	13.30	63.4	4.63	27.36	64.8	102.2
1933	12.41	59.2	5.42	32.36	65.9	111.3
1934	13.64	65.0	5.20	32.24	74.9	115.2
1935	13.55	64.6	5.29	33.01	80.0	123.8
1936	14.10	67.2	5.35	34.29	80.8	120.2
1937	14.58	69.5	5.40	35.37	86.3	124.2

*American Petroleum Industries Committee, Taxation Bulletin, Vol. 3, No. 4, June 1938, p. 35.
†American Petroleum Industries Committee, Taxation Bulletin, Vol. 2, No. 12, February 1938, p. 143.
‡U. S. Bureau of Labor Statistics, Survey of Current Business.
§Column 5 divided by Column 2.

*Paper presented at thirty-sixth annual meeting, National Petroleum Association, Atlantic City, N. J., September 15, 1938.

[1]The writer is indebted to Dr. Norman D. Fitz Gerald, department of petroleum economics, the Chase National Bank, for assistance in preparing the data upon which this paper is based.

Economics of Pipe Line Metering

By WILLIAM G. HELTZEL
General Superintendent, Stanolind Pipe Line Co.

UNTIL recently it was customary for all pipe line companies to provide at least two tanks for checking field receipts at a gathering station, regardless of the amount of oil received. In general, the smallest tanks used for this service were 1,600 bbls. and the largest 55,000 bbls. in capacity. While one tank was being emptied by the station pumping equipment, the other was being filled with oil received from the gathering lines connected to the producers' lease tanks. With each successive relay through a field gathering station, the oil was checked in such tanks and finally the composite stream was checked again, usually in 55,000-bbl. tanks, when it reached the trunk line station. This procedure for checking at the field gathering and trunk line receiving stations was not only unreliable, but also expensive on account of evaporation losses, investment in and maintenance of tankage and station piping systems. For these reasons, a few years ago one pipe line company abandoned the practice of checking the oil in tankage at each gathering station; and now only the composite field receipts are checked in large 55,000-bbl. tanks when the oil reaches the nearest trunk line receiving station. Even for this latter operation, a large investment in tankage and a complicated system of interconnected piping is required at the trunk line receiving points. The attendant expense of labor for the switching of streams, making tank gauges, and maintaining these cumbersome facilities coupled with the evaporation losses, represent a hidden, yet a real and burdensome operating cost. Even though the use of the positive displacement type meter for this service is only in the development stage, the results already presage not only simplified facilities and operations at trunk line receiving points for field oil, but also large savings in evaporation losses by keeping the crude oil moving through an almost closed pipe line system from the time it leaves the producers' tanks until it arrives at its destination. The use of the positive displacement meter for this service (which has been an outstanding development of the past year) should open the way for more economies and a higher efficiency in pipe line operations.

The measurement of crude oil is not comparable with the simple means used for measurement of gas, water and electricity.

The measurement of crude oil is not a simple procedure and the use of crude oil meters should not be undertaken with the thought that accurate results can be obtained by simply placing a meter in a pipe line without a careful selection of the type and proper technical supervision after it is installed. The extensive use of meters in our homes for the measurement of gas, electricity and water is partly responsible for the impression that the measurement of crude oil in transportation systems can be carried out in a similar degree of simplicity. In the first place, by the nature of the distribution and the character of these commodities, metering is a necessity. The delivery of so many gallons of water, cubic feet of gas, or kilowatts of electricity to as many as 25,000 customers, which would be typical of a distribution system for these commodities in a city like Tulsa, cannot be measured for quantity or volume, except through metering devices. Consideration must be given also to the fact that these commodities are stable in their characteristics and from the metering viewpoint are practically free of impurities and foreign substances. The delivery of these commodities can be made under fairly stable, standardized and controlled conditions. Regardless of where these commodities are used or distributed, their common and rather stable characteristics account for the lack of important discrepancies in their measurement. In the case of water, reasonable errors in its measurement are relatively unimportant on account of the low price paid for it. A meter, with a reasonable accuracy, used for metering water cannot be used for accurate measurement of crude oil. For the present the successful use of the meter for crude oil pipe line service will depend on:

(a) The selection of a proper type.

(b) Using it only where the factors can be controlled.

(c) Providing the necessary auxiliary equipment.

(d) A regular schedule for calibrations and adjustments.

(e) A careful technical supervision of the meter and its auxiliary equipment.

The varying characteristics of crude oil must be considered in the use of meters for crude oil service.

In the development of meters for crude oil transportation systems, consideration must be given to the nature of the operations, as well as the characteristics of the crude oil to be handled. In general crude petroleum is a raw product containing such impurities as sand, grit, emulsions and salt water—commonly known as basic sediment and water (b.s. and w.). Crude oil contains corrosive elements in addition to the salt water. Crude oil contains gases in solution, which are released as the pressures are reduced. Paraffin, in crude oil, drops out of solution with the lowering of temperatures, or by the evaporation of the more volatile matter. Crude oils vary widely in characteristics. Some oils are dense, viscous, and have a low volatility like tars; others are highly volatile and flow easily. Some crude oils are comparatively free of b.s. and w., while others must be treated to remove the excessive impurities, before the oil can be run into the pipe lines. Crude oils, containing high percentages of paraffin, cause difficulties in their transportation on account of the precipitation of the paraffin. All of these factors must be considered in the development of meters for crude oil transportation service.

The positive displacement type meter fills a

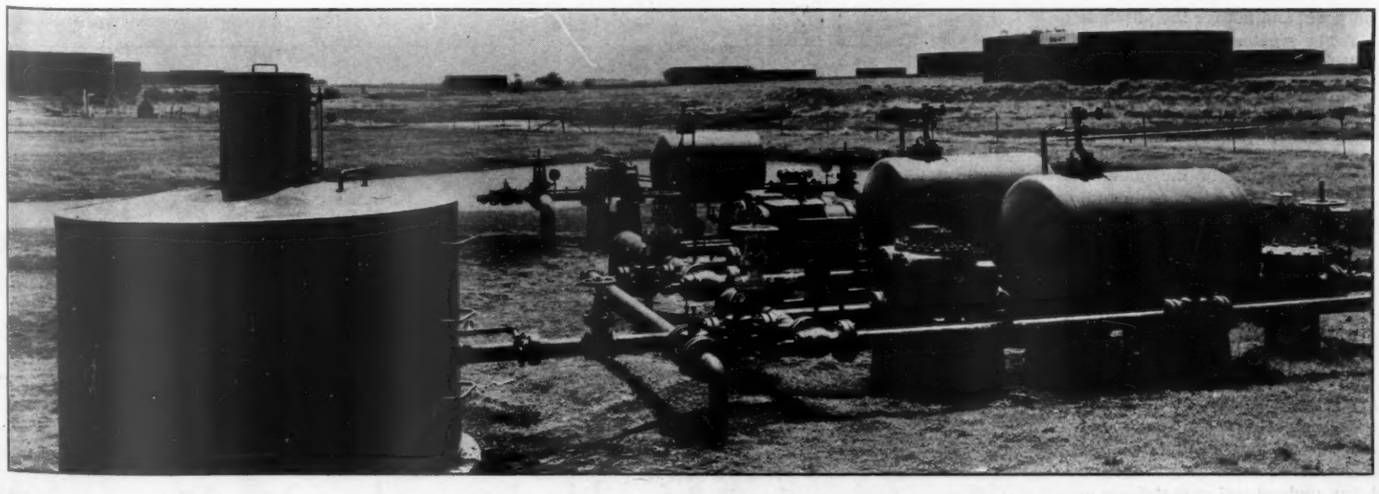


Fig. 1—This installation of two 4-inch and one 6-inch meters at a trunk line station made available five 55,000-bbl. checking tanks for the storage of a certain class of oil, which was being batched through the trunk line system. The meters also solved serious corrosion problems in tanks, which had been used for checking crude oil containing hydrogen sulfide gas

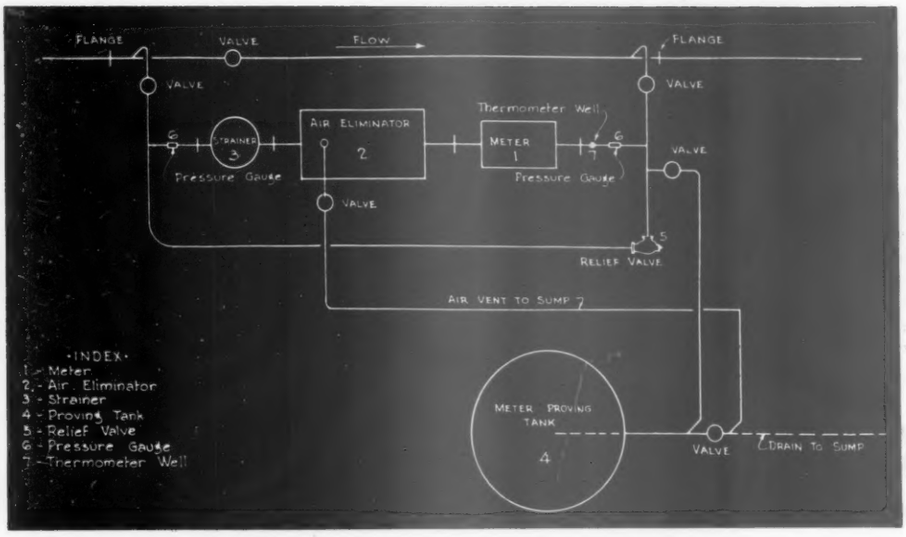


Fig. 2—Diagramatic sketch showing a typical installation of a piston type meter, the auxiliary equipment and the interconnecting piping

need in the pipe line industry.

The piston type meter has been used by a few pipe line companies at the following places for checking crude oil:

(a) Discharge lines of field gathering stations.

(b) Receiving end of field gathering lines at trunk line stations.

(c) Receiving end of trunk lines between two trunk line stations.

(d) Suction lines between the working tanks and the pumping units at field gathering stations.

(e) Suction side of suction pumps, in connection with gravity lines.

(f) Delivery lines to refineries.

Although the first meters, installed by the pipe line companies for experimental purposes, have been in service for only about two years, the progress in meeting the practical problems indicates that the positive displacement meter will find further use and application in the pipe line industry in the next few years; however, care must be observed in not trying to use these meters where they cannot function properly. The use of meters is still in the development stage for crude oil pipe line service and many problems will be encountered as their use becomes more extensive. Pipe line engineers are firm in their opinion that for the present these meters can be used only for checking purposes and not for the purchase or sale of crude oil. The greatest success in the use of the meters will logically be found where the factors involved in their operation are fewest, simplest and can be controlled for accuracy. The manufacturers will find it wise and prudent to be guided by the problems encountered and by the results obtained through the use of the meters in their present applications before recommending their extensive use.

Experience in the use of the piston type meter.

The results from the use of a piston type meter on suction or gravity lines have not been satisfactory and no comments will be made on their use at these locations. Only a moderate degree of success has been found in the use of the piston type meter operating under high pressures at field gathering stations. Two or three pipe line companies have been using the piston type meter with reasonable success for checking field receipts from lateral lines into tributaries serving the trunk lines. It is my understanding that these meters are operating at pressures up to 400 pounds. Because of the author's limited information on these installations, no further discussion can be offered. The results obtained in the use of the piston type meter for checking field receipts at trunk line stations, deliveries to refineries, deliveries from lateral into tributary gathering lines and pumpings between trunk line stations have been reasonably satisfactory and are sufficiently encouraging to indicate that the positive displacement type meter will find a further application for checking crude oil receipts and deliveries at these locations.

A typical piston type meter installation for checking field receipts at a trunk line stations is described.

The meter and its auxiliaries for connecting the meter into the crude oil lines and the relationship of the meter to the trunk line station facilities are shown in the simple but typical diagrams in Figures 2 and 4. This installation is also shown by pictures in Figures 1 and 3. The meter installation itself consists primarily of:

(a) The meter installed on a by-pass piping system.

(b) Air eliminator.

(c) Strainer.

(d) Proving tank.

(e) Relief valve supplied with indicator to show that crude oil has been by-passed through the relief valve.

(f) Low pressure gauges for determining pressure drops across the instrument.

(g) Recording thermometer for obtaining temperatures of oil passing through the meter.

(h) Remote counter and transmission system for the operation of a counter on the instrument board in the station building.

The meter should be installed on a by-pass to avoid any discontinuity in the oil receipts when it is necessary to take the meter out of service for inspection, repairs or calibrations. A stationary 10-bbl. proving tank is provided at each of these meter installations at the trunk line stations for the purpose of making calibrations of the meters according to a regular schedule. The air eliminator is required to remove air accompanying the field oil, which would affect the accuracy of the meter. The strainer is supplied for the removal of debris, b.s. and w., welding dross and sand in the crude oil stream and to protect the meter against excessive wear. The relief valve is used to protect the meter and its auxiliary equipment against excessive pressures; the relief valve is provided with an indicator to show whether it has functioned and caused the by-passing of some oil around the meter. As a means of determining excessive pressure drops either on account of accumulation of paraffin or sediment in the strainer or some obstruction in the piping system, a manometer is provided to measure the difference of pressure before and after the oil passes through the meter and the auxiliary equipment. The remote counter is used on the instrument board at the station, 600 to 1,000 feet away, to facilitate observing the meter readings for the hourly checks. The recording thermometer is used for obtaining the temperature required for computing corrections used to determine the overage or shortage against the oil run from the lease tanks. The auxiliary equipment described above in this typical installation will, in most cases, be required for accurate results. Early experience in the use of the displacement type meter without this auxiliary equipment showed immediately that a reasonable accuracy could not be obtained without facilities for calibrating the meter, as well as means for controlling the other variable factors.

The use of the meter in the simplification of facilities is explained.

About two years ago, one of the pipe line companies was faced with the problem of receiving and checking 40,000 bbls. of field oil at a trunk line station which had been built 20 years ago for the purpose of relaying a trunk line stream; consequently, it was not supplied with sufficient facilities for checking 40,000 bbls. of field receipts in

(Continued on Page 156)

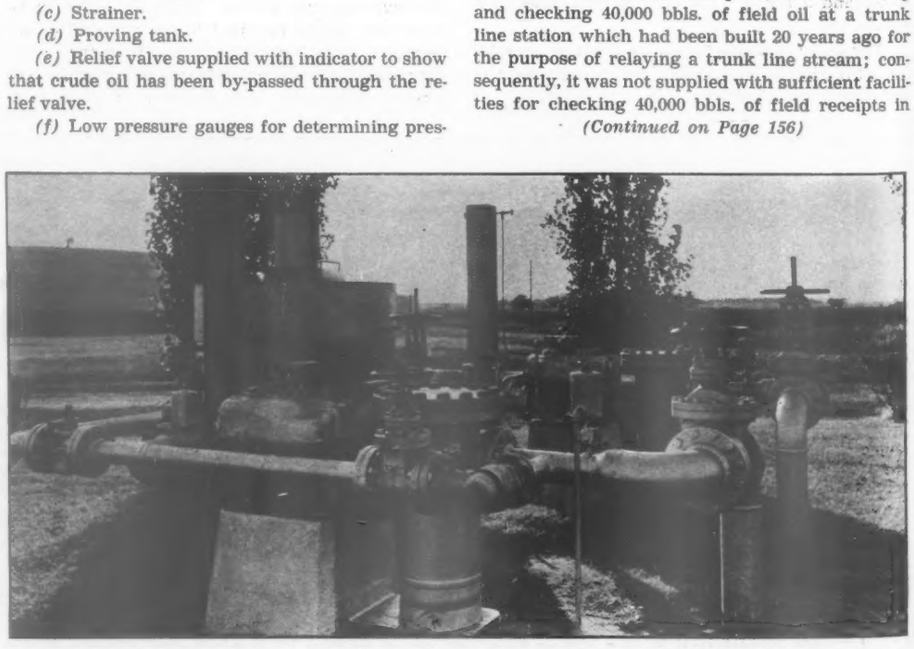


Fig. 3—This installation of two 6-inch meters saved an investment in an additional 55,000-bbl. tank and about 2,000 feet of 16-inch suction line

Unitized Centrifugal Pipe Line Pumps Practical

By H. W. MANLEY
Barnsdall Oil Co.

There has been a distinct trend towards the unitizing of mechanical equipment for all branches of the oil industry during the past few years. This development has been for the purpose of reducing intangible installation costs and obtaining a more portable type of equipment. The unitized drawworks, together with a gas- or Diesel-powered rig, have been developed and generally accepted by the industry, due to their portability. Individual well pumping surface equipment has been so successfully unitized that this type of pumping unit has almost completely replaced the more expensive installation of band-wheel rig front pumping equipment in the more recently developed fields. For permanent or semipermanent pipe line station equipment, however, the use of unitized pumping equipment has not been generally applied, although the combination of improved mechanical equipment designs and applications has pointed the way towards unitizing of this type of pipe line pumping equipment.

Development of Centrifugal Pumps for Pipe Line Service

Since the development of the high-speed centrifugal pump, with its greatly increased efficiency and comparably low initial cost, the pipe line designing engineer has had to give careful consideration to its use for all types of pipe line pumping services. Due to its required high speed, however, early applications of this type of pump generally used electrical motors as prime movers. These electrical centrifugal pipe line pump units were successful when the predetermined capacity rates of the pipe line could be adhered to in order to obtain the maximum mechanical efficiencies that would result in the minimum electrical power cost. The average pipe line station, however, requires a flexibility of capacity rates, which, in the case of a centrifugal pump, reduces its mechanical efficiency and thereby increases the unit power operating cost, when purchased electric power is used as the prime mover for pipe line stations.

Cognizant of the loss of mechanical efficiency of the centrifugal pump when operated at reduced capacity rates, it was at the insistence of a few pipe line engineers that this type of pump was applied to oil- or gas-engine prime movers. By applying the engine drives to centrifugal pipe line pumps, the cost from the overall loss of mechanical efficiency of the centrifugal pump unit would become negligible, due to the fact that the variation of fuel consumption efficiency of an engine does not vary over a few per cent for the average required pipe line pump capacity rates. The engine-driven centrifugal pump also gives the pipe line station a flexible pump unit, since the capacity of a centrifugal pump varies directly with the speed; and, therefore, it was possible to regulate the engine speed to develop the required capacity rates of individual pipe line stations.

Development of the Engine-Driven Centrifugal Pump Units

In 1930 one of the major pipe line companies of the Mid-Continent area constructed a pipe line a distance of 600 miles from Borger, Tex., to St. Louis, Mo. On this pipe line all of its original 21 pumping units consisted of 3,600 r.p.m. centrifugal pumps driven by gas engines through speed increaser gears having a ratio of 1:9.6. Although other engine-driven centrifugal units similar to this company's installations had been used prior to 1930, it is believed that the Borger-St. Louis gasoline line was the first main line to be operated solely with this type of pump unit. Eight years of operation of these engine-driven centrifugal pipe line pumps has proved the economics of gas engines as a prime mover power, and the flexibility of capacity rates due to the possible wide variation of engine speeds.

The prime movers on this pipe line, however, weighed approximately 100 pounds per rated horsepower, without taking into consideration the added weight of the gear increaser and the centrifugal pump. The comparatively slow-speed engines, having a speed of 375 r.p.m., also required extra-large speed increaser gears. As a result, expensive foundations were required and the necessary accurate alignments between the engine, speed increaser and pump had to be made in the field during the construction of each pipe line station.

Development of Multi-Cylinder High-Speed Engines

During the time that the high-speed centrifugal pump was being applied to engine drives for pipe line pumping service, it became obvious that it would be mechanically and economically advantageous to use high-speed multicylinder engines, instead of the slow-speed engine drives. The application of the high-speed engine as a prime mover for centrifugal pump units would result in less expensive initial construction cost, since this type of unit did not require excessive foundations and the detailed cost of field installation and construction. However, the design characteristics and the economic operating results that had proved the slow-speed engine successful for full-load continuous service had to be applied to the high-speed engine by its manufacturers.

Today there are several high-speed engines on the market which have the equal operating economics of the low-speed engine. These economical operating results are due to the progressive applications of alloy metals to the various parts of the high-speed engine by its manufacturers. Chrome nickel molybdenum steel in the crankshaft, and special-designed aviation-type valves, together with aluminum alloy pistons, have all played their part in reducing the weight of the high-speed engine. As a result, high-speed engines of today weigh only 25 to 35 pounds per maximum rated horsepower, as compared to the approximate weight of 100 pounds per rated horsepower of the average slow-speed engine.

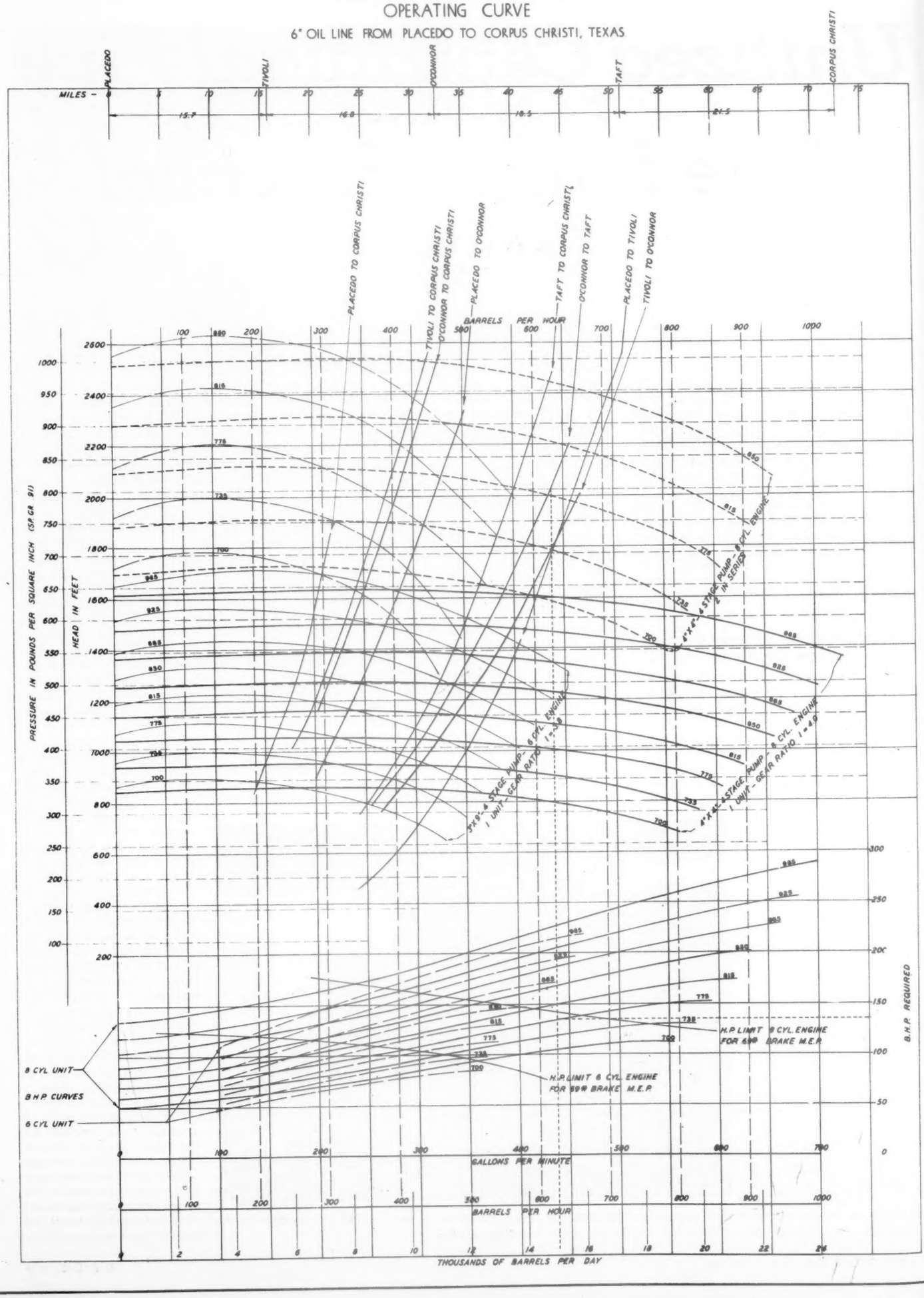
The special-designed dual aviation-type valves give the minimum pounding effect on the valve seats. This type of valve, together with the use of extra-hard and heat-resistant alloy insert seats, has reduced the maintenance of such parts below that of comparable parts of the slow-speed engine. The design of cylinder heads with uniform thickness of metal has allowed the more rapid dissipa-

Gas engine and centrifugal pump mounted on steel skids for portable main line service

BARNSDALL PIPE-LINE COMPANY

OPERATING CURVE

6" OIL LINE FROM PLACEDO TO CORPUS CHRISTI, TEXAS



tion of the temperatures from the heat of combustion within the cylinder, and has permitted the successful use of higher mean effective pressures. The use of counterbalanced crankshafts and aluminum alloy pistons has reduced the bearing stresses and pressures below those obtained on the so-called "heavy-duty type engines." Therefore, the engine designers have produced a high-speed product which will give the operating economies of the slow-speed engine, providing the designing and operating personnel for the prospective purchaser uses well-established engineering principles governing the application and operation of such units.

Design Application of Speed Increaser Gears

Speed increaser gears have been in use in other industries, but were uncommon in the pipe line industry when first applied as the intermediate member between the engine and centrifugal pump. The design of the increaser gears requires a higher standard of accuracy for the necessary successful and quiet operation of such gears than the speed-reducing gears, although there is no mechanical or efficiency difference between the two types of gears. However, the unusually high pitch line velocities of the speed increaser gears and journal velocities in the bearings create problems of lubrication design, and require very accurate balance of all rotating parts.

The design of speed-increasing gears is not so much a problem of applied loads as it is a problem of preventing unbalanced loads within the gears themselves. As an example a half ounce out of balance at 200 r.p.m. will often have the WR squared effect of 3 pounds at 6,000 r.p.m. As of today, there are only two or three gear companies that seem to be able to produce a satisfactory step-up gear.

The high-speed increaser requires a forced system of lubrication. This lubrication system not only reduces the "churn" of the lubricant to a minimum, but also provides a means of absorbing the heat of friction losses above that which the gearcase has the capacity to dissipate by radiation. As a result, the application of lube oil coolers is essential to the successful operation of step-up gears for engine-driven centrifugal pumps.

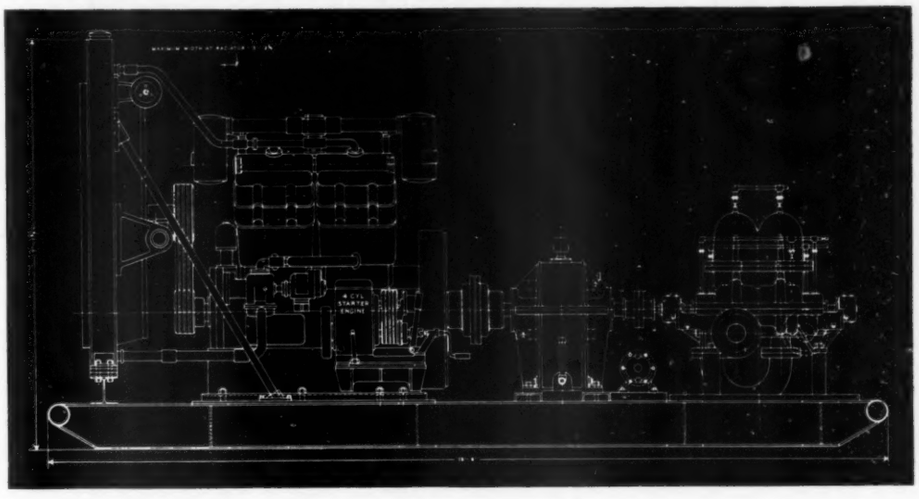
Application of Unitized High-Speed Engine-Driven Centrifugal Units

Early in 1937 the Barnsdall Oil Co. decided to lay a 6-inch pipe line from Placedo, Tex., to its new refinery at Corpus Christi, Tex. After considerable investigation of pumping equipment, the engineers of the Barnsdall Oil Co. and representative equipment companies developed a unitized high-speed engine-driven centrifugal pipe line pump unit that can be used for either permanent or semipermanent pipe line station service. While none of the equipment used in the design of these pumping units is new to the industry, the combination of applying the equipment design details, correlated with initial and operating cost, has developed some interesting data.

The first requirement was to develop a standard design of pump unit that would have capacities of 5,000 to 30,000 bbls. per day with discharge pressure ranging from 400 pounds to 900 pounds per square inch. This requirement was necessary due to the fact that the potential of several new fields being developed in the area traversed by the pipe line system was unknown. Since the deliveries to the several pipe line station points would change with the allowables and depletion of the respective oil fields, a portable pipe line unit having the required capacities was necessary to reduce station construction costs. While a portable pipe line unit was desirable, it was also realized that such pumping units should be designed so that they could be used for permanent station pumping units.

To meet these requirements, three sizes of unitized engine-driven centrifugal pump units were selected, having the proper size engine, centrifugal pump, and speed increaser to develop the required horsepower and deliver the desired pump pressures and capacities. All of the centrifugal pumps were rated at a speed of 3,600 r.p.m., and the high-speed multiple-cylinder gas engines were directly connected to these centrifugal pumps through speed-increaser gears, having an approximate ratio of 1:4. The proper sizes of engine, speed increasing gear, and pump were then mounted on an electrically welded structural steel frame, as shown in the general unit plant picture. By assembling the various pieces of equipment on a common skid, it has been possible to obtain machine-shop accuracy of the necessary alignments, and eliminate the customary haphazard alignments of field construction.

The respective unit capacities, unit weights per brake horsepower, and equipment cost per thousand barrels of daily capacity when operating at a 450-pound discharge pressure, are submitted in the following table:



Outline drawing of portable unit showing how engine step-up gear and pump are mounted on steel skids

UNITIZED ENGINE-DRIVEN CENTRIFUGAL PUMPS ON BARNSDALL LINE

		Unit equip. data		
Unit description—	Total weight lbs./ sq. in.	Capacity bbl./day at 450 lbs./ sq. in.	Cost/ 1,000-bbl. daily capacity	Weight /1,000-bbl. daily capacity (lbs.)
6 cyld. 3" 4-stage ..	10,000	10,000	$600.00	1,000
8 cyld. 4" 4-stage ..	13,000	17,000	440.00	765
12 cyld. 6" 4-stage ..	17,000	25,000	390.00	680

In the selection of the various sizes of centrifugal pumps, four-stage centrifugal pumps were used having special designed impellers by which each pump could deliver against 600 pounds working pressure when the speed of the pump was 3,600 r.p.m. The pump packing glands and pump were designed for 1,000 pounds working pressure to assure satisfactory operation in case it might become necessary to operate the two pumps in series for higher line pressure characteristics. The six- and eight-stage centrifugal pumps were considered from the standpoint of obtaining higher working pressures from the individual units. However, the characteristic of the centrifugal pump to work in series on the line and take advantage of any intake pressure at the station to obtain higher discharge pressures, has proved that the four-stage centrifugal pump is the best adapted for the average pipe line pressure characteristics.

As an example, assume Stations "A," "B" and "C," operating on a 6-inch line, at 25-mile intervals, with one four-stage centrifugal pump at each station, designed to operate from zero pounds intake to 600 pounds per square inch discharge pressure. Station "A" has only 10,000 bbls. per day to deliver, whereas Station "B" will have the 10,000 bbls. per day from Station "A" and an additional 2,500 bbls. per day that will be delivered to Station "B" point. When delivering 10,000 bbls. per day from Station "A," the pressure drop over the 25-mile distance to Station "B" will be 475 pounds, although the discharge pressure from Station "A" is 600 pounds. As a result, Station "B" will have 125 pounds residue pressure on its intake from Station "A." With Station "B" having to deliver 12,500 bbls. per day to the next station, the pressure drop through the 6-inch line would be approximately 700 pounds. Since the four-stage centrifugal pump at Station "B" has been designed for only zero pounds to 600 pounds maximum discharge pressure, the required pressure of 700 pounds discharge pressure from Station "B" to deliver to Station "C" would not be possible, unless some of the residue intake pressure of Station "B" was used, or a second pump unit installed to work with No. 1 unit at Station "B." However, since Station "B" has 125 pounds residue pressure on its intake, this pressure can be utilized or added to the 600 pounds pressure from Station "B," and thereby obtain the required discharge pressure to deliver the 12,500 bbls. per day to Station "C." Therefore, the excess pressure not required for actual delivery between Stations "A" and "B" was utilized by Station "B" to take care of added deliveries, without having to use extra power, pumps, or added stages to Station "B" pump to obtain a higher discharge pressure.

In order to make a correct pump and engine selection, the accompanying operating curve was prepared for the Barnsdall Oil Co. Placedo-Corpus Christi pipe line, and serves to illustrate the flexibility of operation of the unitized engine-driven centrifugal pipe line units at various speeds. The pump station locations originally selected (and on which the curve was based) are shown at the top of the accompanying curve. Due to certain difficulties encountered in obtaining station sites, it was necessary to locate the

(Continued on Page 180)

The Nation's Gasoline

By W. T. ZIEGENHAIN

COVERING a distance equal to twice that across the continent from east to west, each mile representing an investment of more than $10,000, and providing swifter and more economical transportation than is afforded any other manufactured product, the gasoline pipe lines of the United States have moved into a position of high importance in the past decade.

The 10 major gasoline pipe line systems now in operation transport the finished motor fuels from refineries to marketing centers which serve a territory representing about one-third the area of the United States and containing about one-half of the country's population. Thus far, all major gasoline systems lie east of the Colorado-Kansas border, and they avoid most of the area south of the Ohio River, but within the 23 northeastern states which they do reach, they tap a market that takes half of the total volume of motor fuel consumed in the United States.

While these systems deliver only about one-fifth of the gasoline consumed in these 23 states, the volume approaches 140,000 bbls. daily, and this is equivalent to about 750 loaded railroad tankcars.

Obviously the movement by pipe lines of this volume of gasoline every day removes a large amount of business from the rails. However, its seriousness is not as great as first appears.

In practically all instances gasoline pipe lines are laid in rather straight lines, connecting the refineries with the largest consuming points. On both sides of the lines are other important consuming points, and many terminals have been built along these lines in order to supply the adjacent markets. Rail transportation has been the principal means for transporting this gasoline. The problem of the refinery traffic manager is now to determine to what terminal he should transport the gasoline by pipe line, for shipment from that point by rail, if the gasoline is to reach its destination at a lower delivery cost than if it were loaded in tankcars at the refinery.

Along with railroad transportation, use is made of tankers and barges if the pipe-line terminal is located on water. Trucks are used to handle the gasoline to be delivered from the pipe-line terminals to the local market.

Influence on Oil Industry

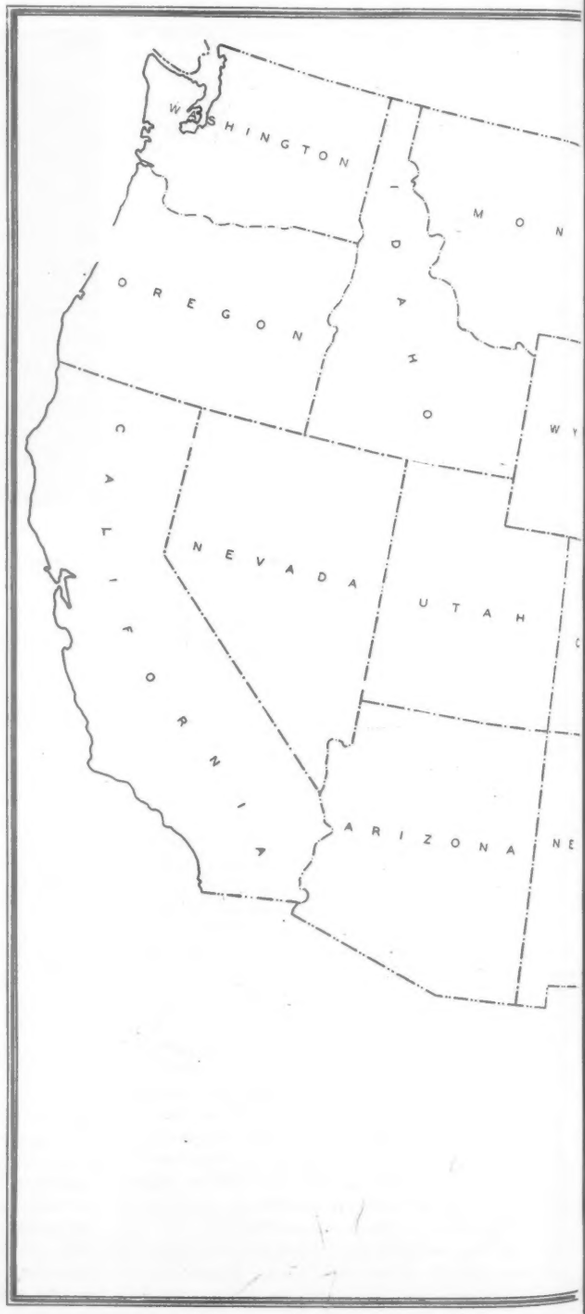
In building gasoline lines the oil industry has assumed an additional investment of something like $70,000,000. This figure is probably low, but as a minimum it emphasizes the oil industry's faith in this method of transportation. In recent years the industry has invested at least $7,000,000 annually to improve the means of delivering its products from logical manufacturing points to the largest marketing centers.

In so doing it has fortified the existence of refining centers in the oil-producing states and along tidewater against the effective competition offered by refineries located in the northern marketing centers which receive their crude oil from the producing states by pipe line.

Recent Construction

In the past year about 650 miles of gasoline pipe lines were laid, half of which represented extensions of older systems and the other half representing new systems. In the list of important extensions should be included 225 miles of 8-inch line completed last October from Williamsport, Pa., to Buffalo, N. Y., as part of the Keystone Pipe Line Co. systems (Atlantic Refining Co.).

An equally important and significant pipe line extension was made by the Sun Pipe Line Co. to its system by extending its facilities for making deliveries to Cleveland on the Great Lakes and to Syracuse, N. Y.



Individual Maps

Detailed maps of the major gasoline pipe-line systems showing refinery connections, location of pumping stations, size of line and terminals appear on the following pages:

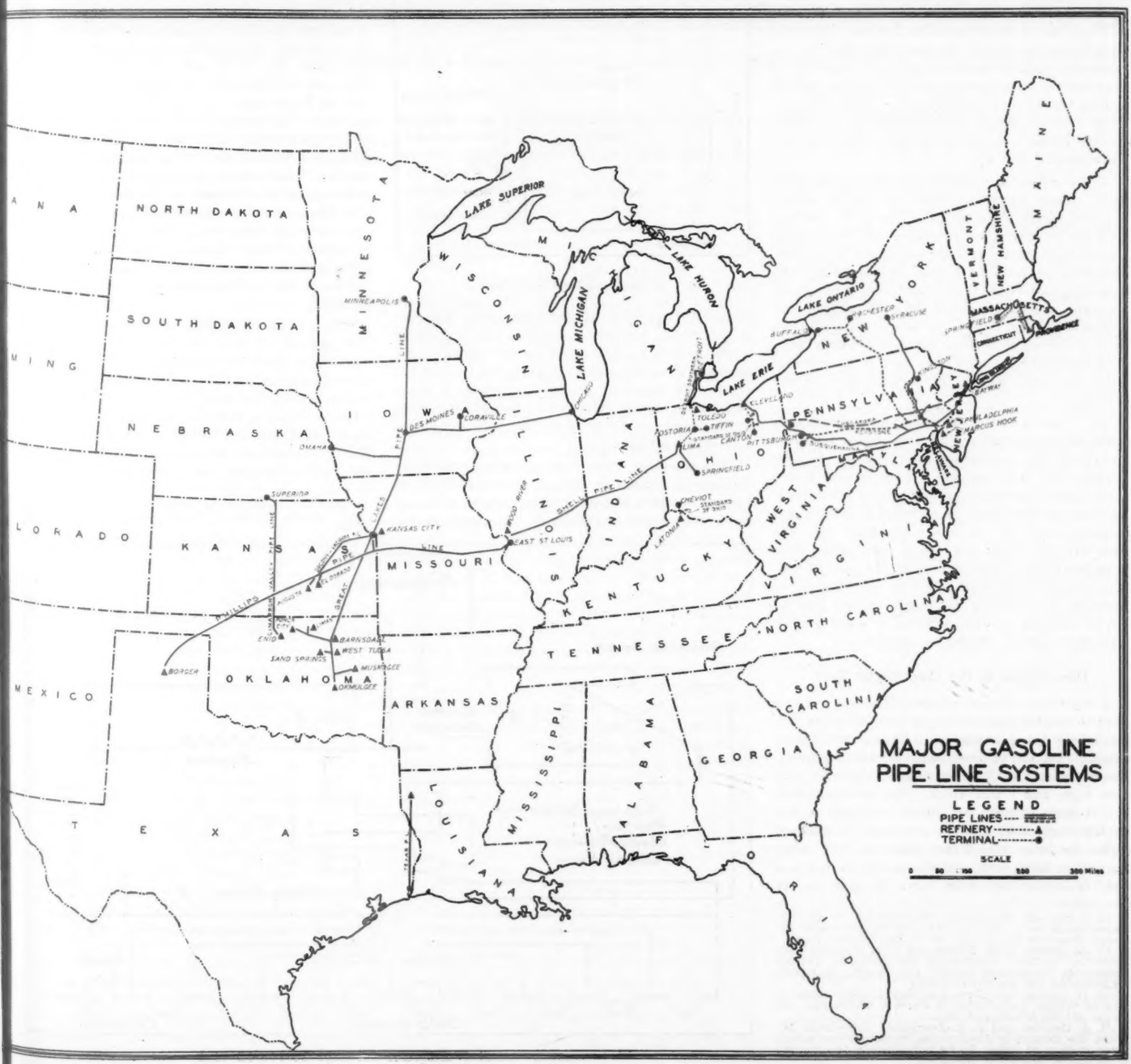
	Page
Great Lakes Pipe Line system	127
Phillips Pipe Line system	125
Standard Oil Co. (Ohio)	125
Shell Pipe Line Co.	125
Cimarron Pipe Line Co.	127
Socony-Vacuum (White Eagle Div.)	127
Sun Pipe Line system	123
Tuscarora Pipe Line system	123
Keystone (Atlantic) system	123

Pipe Line Facilities

Among the more important new systems (as distinguished from extensions of old ones) laid in the past year is that of the Shell Pipe Line Co., reaching from the company's refinery at Wood River, Ill., to Lima, Ohio, with a branch going to Springfield, Ohio. Another important "independent" system was created this year when the Standard Oil Co. of Ohio constructed its series of lines from Lima to Fostoria, where it connects with a line to Detroit; a line between Canton and Cleveland, and a line from its Satonia, Ky., refinery to Cheviot, Ohio.

Important looking jobs have also taken place in the past year, most notable of which have been those undertaken by the Great Lakes Pipe Line Co. Internal pipe corrosion, a factor present in all gasoline lines, caused an accumulation of residue that cut down the capacity of the existing lines to the point where looping became necessary at certain points. The acquisition of a working interest in the line by the Cities Service Oil Co. was also a factor in the decision to loop the line between Ponca City, Okla., where the Cities Service refinery is located, and Barnsdall, Okla., where a principal pumping station is in operation.

As these and other major construction projects were completed it was the belief on the part of some students of marketing that the extension of gasoline lines had reached an economic limit. Others maintain there is justification for similar lines into the Southeast.



Making Soil Corrosion Survey by Using Electrolytic Test

By I. A. DENISON
National Bureau of Standards

An electrolytic test for measuring the corrosiveness of soils has been described previously.[1,2] The soil to be tested is placed in a corrosion cell between two electrodes of the same metal, the soil acting as the electrolyte. The cell is constructed in such a way that corrosion proceeds under conditions of moisture and aeration similar to those that prevail naturally in soils. The total polarization produced on the electrodes by an externally applied electromotive force is measured immediately after opening the circuit and plotted against the current density on the anode. The average current density corresponding to a limited voltage range is taken as a measure of the corrosiveness of the soil.

The electrolytic measurements have been shown to be closely correlated with the loss in weight of a steel anode over a period of two weeks and also with the results of the long-time field tests of the corrosion of metals in soils which are being conducted by the National Bureau of Standards.[3] The data obtained from these field tests consists of accurate measurements of loss of weight and depths of pits on five or six sets of 16 specimens each of wrought ferrous materials which have been removed biennially from each of 47 representative test sites located in various parts of the country.

An accurate record of leaks and replacements made on an extensive pipe line system provided an opportunity to correlate the results of the electrolytic test with corrosion experienced under actual operating conditions and hence to determine whether the test might be of value in making soil corrosive surveys. As the electrolytic test was successful in measuring the corrosiveness of a large percentage of the soils along the right of way of a 128-mile section of this pipe line system,[4] it would appear that the test might be used practically in deciding to what sections of a prospective pipe line coatings should be applied.

Description of the Electrolytic Test

1. *Test cell.*—The corrosion cell consists of two steel electrodes separated by a layer of moist soil, the whole being contained within a brass ring which forms part of the external circuit (Figure 1). The brass ring is 5.5 cm. in internal diameter, 12.5 mm. high, and 1 mm. thick. The cathode which is a 16-mesh (6-mesh per linear cm.) steel screen having wires 0.46 mm. in diameter, is soldered across the brass ring 2 mm. from the top. After the cell is filled with soil, the anode, which is a disk of cold-rolled mild steel 45 mm. in diameter and 0.3 mm. thick, is placed in position on the surface of the soil 2 mm. from the cathode. The upper surface of the soil not covered by the anode is covered with a thin layer of paraffin to exclude air from the anode. Electrical connection between the anode and cathode is made through a binding post on the brass ring by means of a copper wire soldered to the back of the anode. The apparent area of the cathode is made equal to the area of the anode by insulating the rim of the screen and the inner surface of the ring with a layer of paraffin.

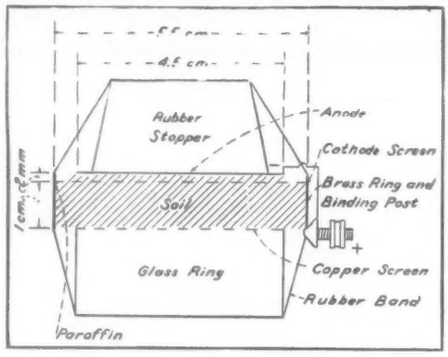


Fig. 1—Corrosion cell

The procedure in setting up the test cell is as follows: The cells in sets of 10 are filled with various samples of soil crushed to pass a No. 20 sieve and packed by placing on the surface of the soil a brass cylinder weighing 500 g. and having a diameter of about 4.5 cm. The soil is prevented from running through the screen by fitting a sheet of filter paper over the screen, inverting the cell and filling the larger compartment. The soil is moistened with water from a burette and a thin ring of melted paraffin is placed around the rim of the cell. The filter paper can now be safely removed and the compartment in which it was placed filled with soil in the same manner. The soil is saturated by allowing it to absorb water from a strip of filter paper, the cell being supported 2.5 cm. above the surface of the water into which the filter paper dips. After the soil has once been moistened, smoothing of the surface should be avoided. Each cell is placed in an individual dish and covered by a beaker to prevent evaporation. The period of saturation is two hours. The rate of moistening of very heavy soils may be increased by adding a slight amount of water to the upper surface of the soil. A sheet of filter paper on the surface of the soil facilitates even distribution of moisture.

The soils are brought to the moisture equivalent (the quantity of water retained by a soil under a centrifugal force of 1,000 times gravity) by the method of Schofield,[5] as described below. A battery of ten 3-inch (2.5 cm.) Buchner funnels set in pressure flasks is prepared by pouring on a filter paper placed in each funnel a sufficient quantity of a thin suspension of kaolin in water to produce under suction a layer about 1 mm. thick. By means

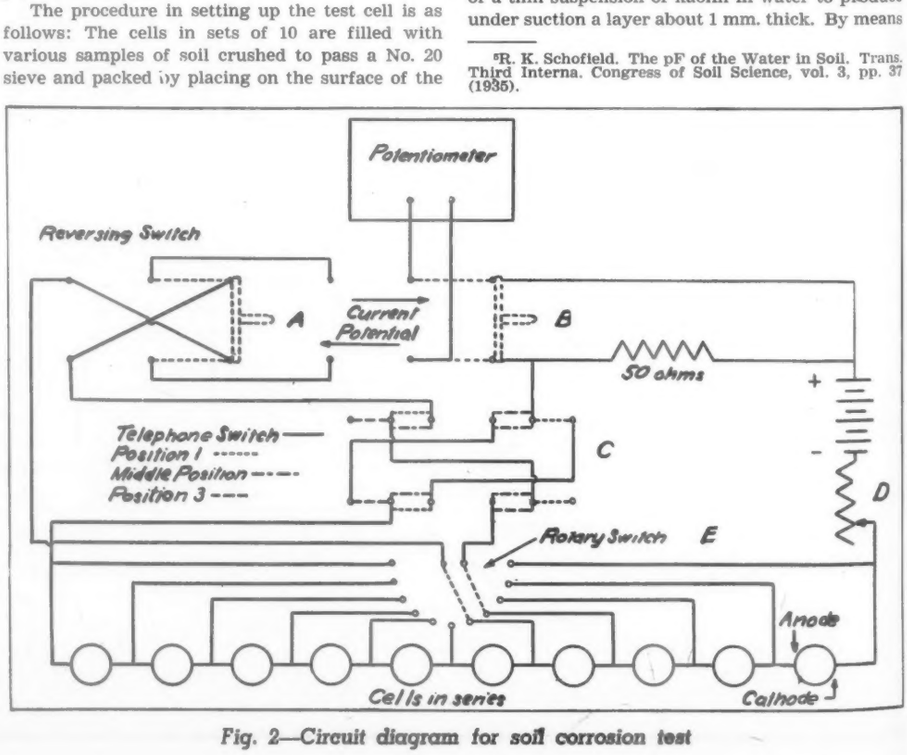


Fig. 2—Circuit diagram for soil corrosion test

[1] I. A. Denison, Electrolytic Measurement of the Corrosiveness of Soils. Bureau of Standards Journal of Research, Research Paper 918, vol. 17, pp. 363-387 (1936).
[2] K. H. Logan, S. P. Ewing and I. A. Denison. Soil Corrosion Testing. Symposium on Corrosion Testing Procedures. American Society for Testing Materials, Philadelphia, Pa., pp. 95-119 (1937).
[3] K. H. Logan. Soil Corrosion Studies, 1934. Rates of Loss of Weight and Pitting of Ferrous Specimens, vol. 16, pp. 431-466 (1936), R. P. 883.
[4] I. A. Denison and R. B. Darnielle. Correlation Between the Results of Electrolytic Tests and the Actual Corrosiveness of Soils. To be published in the Bureau of Standards Journal of Research.
[5] R. K. Schofield. The pF of the Water in Soil. Trans. Third Interna. Congress of Soil Science, vol. 3, pp. 37 (1935).

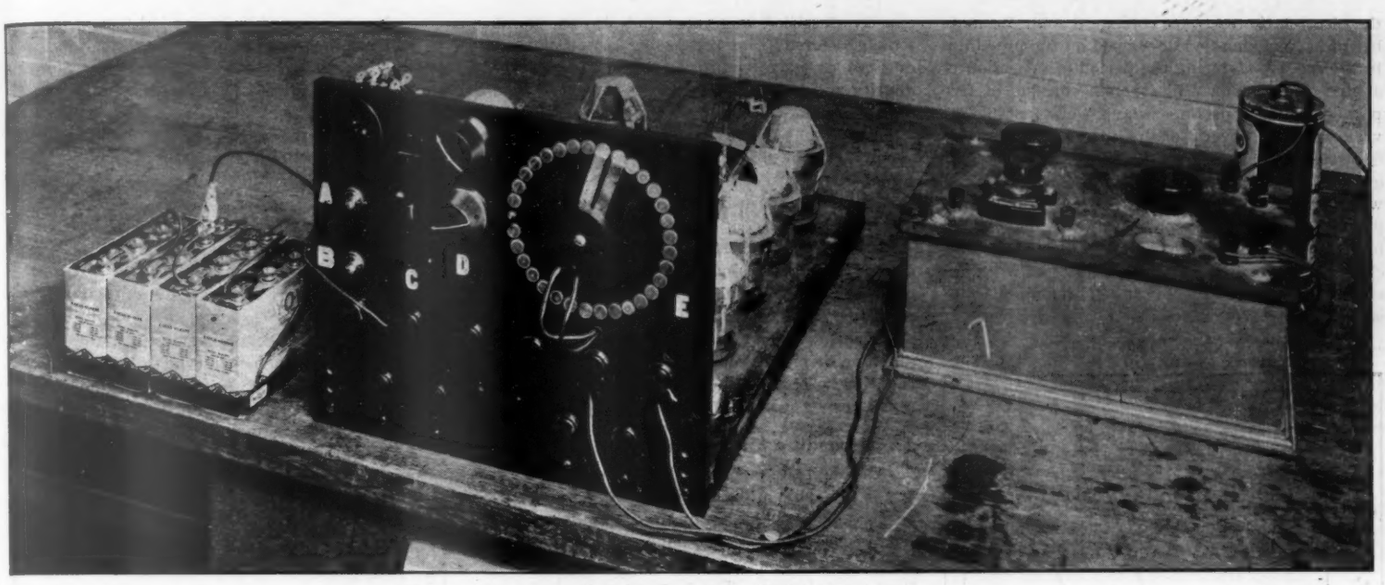


Fig. 3—Apparatus for measuring corrosiveness of soils. A—Reversing switch; B—current-voltage switch; C—lever key; D—rheostats; E—rotary switch

of this layer any desired pressure difference up to one atmosphere between the interior of the flask and the outer surface of the layer can be maintained. A second piece of filter paper is placed over the kaolin layer and saturated with water. After removing the ring of paraffin from the electrolytic cells, the latter are placed in position top down on the paper. A pressure difference of 10 cm. of mercury is held for one hour after which the pressure is increased in increments of about 5 cm. every 10 minutes until a pressure difference of 59 cm. is reached. This latter pressure maintained for one hour reduces the moisture content of a saturated soil to the moisture equivalent.

In testing the corrosiveness of organic soils, such as peats, mucks and tidal marshes in which the average moisture content in nature is often close to saturation, it seems preferable to reduce the moisture content only slightly below saturation rather than to the moisture equivalent. This may be accomplished by subjecting the cell to a pressure difference of 5 cm. of mercury for one-half hour. Because of the marked tendency of organic soils to absorb the oxygen that is required for depolarization of the cathode, it is necessary to omit the 1-cm. layer of the soil below the cathode.

While the moisture content of the soils is being adjusted the anodes are prepared by rubbing one face in opposite directions with No. 1G French emery paper. The electrodes are then cleaned successively with ether and alcohol followed by rubbing with filter paper moistened with water. A No. 24 copper wire is then soldered to the reverse face of the anode near the edge, and one coat of lacquer is applied to this face.

After the soils have reached the proper moisture content, the pressure is released, and the cells are removed from the funnels by blowing into the tip of the funnel. Because of shrinkage of the soil resulting from the withdrawal of water cracks will often be noticed between the soil and the brass ring. As a crack will provide a channel through which air can pass to the electrodes, it is necessary to seal it with melted paraffin which is applied by means of a medicine dropper. The anodes are placed in position and electrical connection between anode and cathode is made through the binding post. The upper surface of the soil between the anode and the rim of the cell is covered with a thin layer of paraffin in order to exclude air from the anode. Good contact between the electrodes and the soil is obtained by inserting a No. 7 rubber stopper and a glass or bakelite ring, having about the same diameter as the electrodes, between the soil and two No. 32 rubber bands wrapped twice around the cell (see Figure 1). In order that the pressure of the ring may be distributed evenly over the soil, a piece of copper screen is cemented across the glass ring. It is especially important that firm contact be maintained between the electrodes and the soil.

The cells are placed in individual 1-pint friction-top cans into which a small amount of water has been poured in order to maintain a saturated atmosphere. In order to prevent a water seal, which would interfere with proper aeration of the cathode when the cell is placed in the can, the cell is inserted in a small glass dish about 4 cm. in height and slightly larger than the ring in diameter. The rubber bands around the cell support the cell in the dish in such a way that free circulation of air is insured. A small amount of water is poured into this dish also. After sealing the lids, the cans are placed in a thermostatically controlled constant-temperature chamber and maintained for 18 to 36 hours at 30° C. in order to stabilize the electrodes. If the room temperature is fairly constant at 30° C. this last step may be omitted. The cells are removed from the cans when the electrical measurements are made. By allowing the cells to remain in the dishes in which they were inserted, less evaporation occurs from the soil while the measurements are being made.

The circuit diagram used in the electrical measurements is shown in Figure 2. It will be seen that the potentiometer is used for measurement of current as well as voltage. The switch by means of which the current and potentiometer circuits are alternately opened and closed is known as a two-way lever key locking in both positions. It may be obtained from manufacturers of telephone equipment. The assembled apparatus is shown in Figure 3. Apparatus shown on the panel and not identified is not required in the corrosion test.

2. *Current density-potential measurements.*—The potentials of the cells after various current densities have been applied are measured on open circuit, each cell being connected in turn to the potentiometer by means of a 10-point rotary switch. In order to avoid change in the potential of the electrodes during the measurement of voltage it is essential that the current flow be interrupted for only a fraction of a second at a time while the potentiometer is being balanced. This is accomplished by alternately opening and closing the circuit by means of a quick-acting switch, the current circuit being closed at two opposite positions and open only at the intermediate position when the potentiometer circuit is closed.

Since only the values of potential resulting from polarization caused by the external electromotive force are required, the voltage is first measured after the cells have been on open circuit for one-half hour and this value is subtracted algebraically from the subsequent readings. The cells are then connected in series and current from one or more B or C batteries passed through them. Current values are used corresponding to definite current densities each being held for five minutes to allow conditions to come to equilibrium. Typical current density-potential curves are shown in Figure 4.

The corrosiveness of a soil is indicated by the average current density corresponding to the potential range from 0 to 0.3 volt. The upper limit of 0.3 volt was selected as being well within the range of voltage that can be produced by differential aeration. As many of the curves are practically straight over the selected voltage range, the average current density can usually be estimated with sufficient accuracy by taking the current density corresponding to 0.15 volt as an approximate value.

About 50 samples of soil may be tested per week by the method that has been described. The differences found between duplicate samples is usually less than 10 per cent. Larger differences can often be reduced by allowing a period greater than 18 hours for stabilizing the electrodes. Although it is desirable to test duplicate samples occasionally, usually only one sample of each soil is tested.

As very little corrosion of the cathode occurs, the same screen cathode may be used repeatedly until there is visable evidence of corrosion. After use the screens are cleaned by immersing the cells for a few minutes in a 10 per cent solution of ammonium citrate followed by thorough rinsing and drying.

Correlation Between Electrolytic Tests and Actual Corrosion on a Pipe Line System

The basis of the procedure for making soil corrosion surveys to be described consists in the correlation that was obtained when the corrosiveness of 27 soil types predicted from the results of

the electrolytic test were compared with the number of leaks which had developed on the pipe lines in the soil types during the period of operation of a pipe line system. This system consists of five parallel 8-inch pipe lines which were installed at various times. Several of the lines were constructed of wrought iron; the others were steel. Their average age at the time the study was undertaken was 33 years. The pipe lines were originally unprotected from corrosion. As leaks developed, temporary repairs were made by means of leak clamps. However, when leaks occurred with increasing frequency in sections of the lines, these sections were reconditioned.

Analysis of the data on leaks and reconditioning

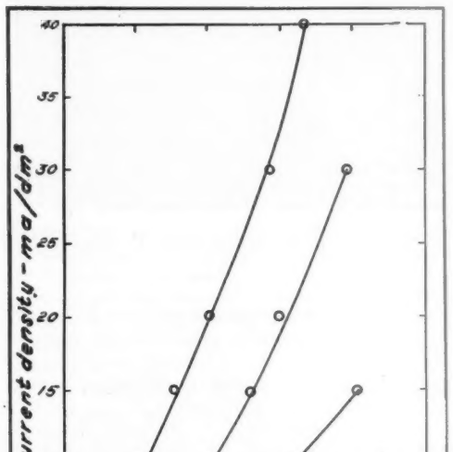


Fig. 4—Current density-potential curves. (Values of open circuit polarization voltage of five soils resulting from previously applied current densities. Correction has been made for initial EMF)

showed that the policy followed in maintaining the lines was not the same in all soils. In certain soils, usually the less corrosive, the tendency was to combat corrosion mainly by the application of leak clamps. In certain other soils in which pipe lines were adjacent to roads, an aggressive reconditioning policy was followed, presumably because the accessibility of the lines to roads lowered reconditioning costs. However, when the data from all of the soils were considered, a rough proportionality was observed between number of leaks per unit length and the percentage of line reconditioned.

Further analysis of the leak and repair records showed that no more reconditioning was done than was necessary to maintain the condition of the system. By plotting for several soils, the cumulative number of leaks per unit length of line and the cumulative percentage reconditioned against the time, it was observed that after 10 to 15 years the curves for both leaks and reconditioning were approximately linear. In other words, by doing a certain amount of reconditioning each year, the development of leaks was held at a constant rate.

In correlating the predicted corrosiveness of the soils with their actual corrosiveness, five ranges of average current density and of leak frequency were chosen and the soil types placed in the proper groups according to their average current density. The number of soil types which were exactly classified was noted and also the number which differed from the proper classification by one, two or more groups. As the ranges of current density and leak frequency were purely arbitrary and a certain amount of over-lapping was to be expected, soils which differed from the correct grouping by a single group were considered for practical purposes to be correctly classified. On this basis the corrosiveness of 18 of the 27 soils, or roughly 70 per cent, was predicted correctly.

A fairer comparison between the predicted and actual corrosiveness of the soils was made by calculating the total footages of the soils which were correctly classified and the footages of the soils which differed from the correct classification by one, two or more groups, and comparing the total footages so obtained with the total length of the pipe lines was correctly estimated.

Procedure for Soil Corrosion Survey

Although the purpose of the soil corrosion survey is to enable a logical decision to be reached as to the soils in which a pipe line is to be protected from corrosion, it is obvious that this decision cannot be reached apart from considerations other than corrosiveness. The purpose of applying protective coatings is to maintain the pipe line system at the least cost rather than to attempt to prevent all leaks. As coatings are usually applied only when by so doing a saving will be effected over the cost of repairing leaks and reconditioning, a rational procedure for deciding where coatings shall be used requires that the results of a corrosion survey be analyzed with regard to economic considerations. Ewing[6] has suggested a method whereby the estimated annual costs of repairing leaks and reconditioning on uncoated sections of a line may be balanced against the cost of coating the remainder of the line in a way which will insure that the pipe line will be maintained at minimum cost. This method will be described further in the following procedure for making a corrosion survey.

1. Map the soils along the pipe line right of way and collect samples of the soils at intervals of at least every one-half mile. Assistance in the mapping of soils can be obtained from the local agricultural experiment station. Samples from the most corrosive horizon of each soil type should be tested. This horizon can be identified for sampling by testing samples taken at different depths in the various soil types after a preliminary survey has been made. Otherwise it will be necessary to collect samples from the various horizons at each location.

2. Test the soil samples by means of the electrolytic test and average the values so obtained for each soil type.

3. Arrange the soils in the order of decreasing corrosiveness as indicated by the electrolytic test.

4. Calculate as a reasonable assumption the probable number of leaks which will occur per 100 feet in each soil type on an 8-inch line in 33 years by means of the equation

$$L = 0.017\,I \qquad (1)$$

where L = number of leaks in 33 years per 100 feet of 8-inch pipe,

I = average current density over the potential range of 0 to 0.3 volt.

This equation was derived by plotting the number of leaks per 100 feet on the pipe line system that has been described against the average current densities of the soil types, and calculating the slope of the line of best fit.

5. Calculate the percentage of reconditioning corresponding to the leak frequencies estimated under 4 by means of the equation

$$R = 160\,L \qquad (2)$$

where R = length of line reconditioned per 100 feet,

L = number of leaks per 100 feet.

This relation was obtained by plotting the percentage of line reconditioned against the number of leaks per 100 feet and calculating the slope of the trend line. The corrodinates of this line, which passed through the origin, were the average number of leaks per 100 feet and the average percentage of line reconditioned weighted for the length of line in each soil type. It is to be understood that the constants in equations 1 and 2 can be expected to apply only to pipe lines on which the maintenance policy is the same as that followed on the pipe line system from which the equations were derived.

6. From the leak frequencies and percentage reconditioned in each soil type calculated under 4 and 5, and after the selection of suitable unit costs, estimate the annual cost of maintaining the pipe line system against corrosion.

7. On a graph in which the annual cost of combating corrosion is plotted as ordinate against the

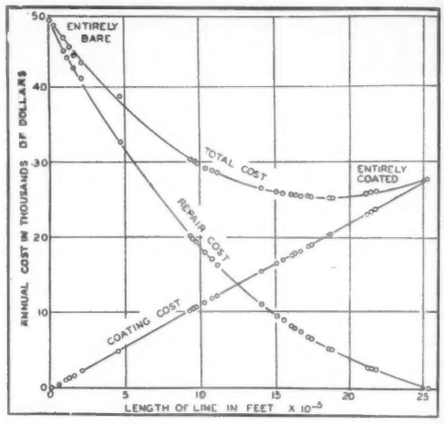


Fig. 5—Cost curves illustrating economic method

length of the pipe line as abscissa, indicate the cost of applying the coating selected to the pipe in each soil type from the most corrosive soil to the lease corrosive. Designate this curve as "coating cost" (Figure 5). The points in the figure represent soil types. As Figure 5 was prepared merely to illustrate the method followed, assumed costs were used.

8. Plot the annual cost of repairing leaks and reconditioning on the pipe line system on the assumption that the coating will be applied to the pipe in each soil type beginning with the most corrosive soil, and (for the sake of illustration) that the coating will prevent all leaks. As the use of coatings is extended to the less corrosive soils, the annual cost for repairs is necessarily diminished. Designate this curve as "repair cost." Practically, it is not necessary to assume that the coating will prevent all leaks, or that a single type of coating is to be used. As the modifications to be made in the procedure under these conditions have been adequately discussed in the paper referred to,[5] they need not be considered here.

9. As the annual cost of combating corrosion on the pipe line system is the sum of the cost of repairs and the cost of the coating, add the plotted values in the curves for "coating cost" and "repair cost" to obtain the "total cost" curve as shown in Figure 5. The point on the abscissa corresponding to the minimum in the total cost curve is the point of separation between the part of the line which requires protection and the remainder on which protection will not be needed. The soil types in which the pipe line is to be protected correspond to the points to the left of the minimum; the soils in which the line is to be laid bare correspond to the points at the right of the minimum.

[6] S. P. Ewing. Corrosion Surveys for Transmission Lines and Distribution Systems. Distribution Committee Report, American Gas Association (1934).

Fig. 1—Workman about to cut 1 1/4-inch rope slings which hold the eight-joint section of pipe between pontoons. The ends of the 1 1/4-inch rope were looped and lashed together by the small size rope, which was cut, effecting a saving in the more expensive, larger sized slings. Fig. 2—P. E. Nicholls, Galveston division manager for Texas Cities Gas Co., stands on laying pontoon to cut rope slings from carrying pontoon. Workman shown recovering slings as they have been cut. Fig. 3—Deep sea diver prepares to descend from his barge to jet trench beneath the pipe. Fig. 4—Workman is pulling on anchor rope to align carrying pontoon

LAYING GAS LINE IN GALVESTON BAY

By H. D. Portwood and T. R. Thompson

Texas Cities Gas Co. Lone Star Gas Co.

TEXAS CITIES GAS CO. recently completed the laying of more than 8,000 feet of 8-inch castiron bell-joint pipe in Galveston Bay in which unusual construction methods and equipment were used. The project consisted of replacing one of two supply lines bringing gas from the mainland to the city, and the laying of the pipe in salt water ranging from a few inches to 17 feet in depth was accomplished in only 16 working days. Rapidity with which the job was completed is attributed to the fact that approximately four months were spent in preparing engineering details and equipment necessary for the submarine construction. Texas Cities two 8-inch high-pressure lines in the bay are among the longest, if not the longest, high-pressure natural gas submarine lines in the United States, and the recently completed construction work probably makes this line the longest undersea castiron natural gas line in the world. The line approaching the bay from its source of supply consists of 14-inch steel welded pipe. At the bay shore this line ends in a manifold header, from which the two 8-inch lines extend across the bay to the island shore. Here another header merges the two lines back into another 14-inch line going into the city of Galveston.

The replacement of one bay crossing line was made necessary because of salt water action upon steel pipe which had been laid in 1928 and 1929. Electrolytic and chemical action resulting from salt water is highly deleterious to steel pipe and it has been so serious in the bay crossing that the company has made five major replacements in ten years, including sections of the other line. The recent castiron job is the largest and most important of these replacements.

In addition to replacement in the bay itself the company has experienced a great deal of difficulty in pipe corrosion on the mainland in the tidal marshes and on the island of Galveston itself where high tide level brings brackish salt water to the surface of the soil. In ten years various salt water activities had damaged the steel pipe until it was necessary to make frequent and highly expensive repairs. Late in 1937 the company replaced 700 feet of the corroded steel pipe across the Galveston Bay ship channel, known as the Intracoastal Canal, with ball-joint cast iron pipe. Later the company replaced 2,000 feet of steel pipe in the bay immediately off the island shore with the same kind of cast iron pipe. The original line was steel welded protected with hot paint application and asbestos felt wrapping.

The new type ball joint cast iron pipe, capable of carrying gas under high pressures, proved satisfactory in these two instances, and the company then decided to replace one entire bay crossing with this pipe. The actual laying started from the channel crossing which had been laid previously and worked toward the island. When this section had been completed the working barges and pontoons then picked up the mainland end of the channel crossing and worked in that direction. Chief among the construction methods, and probably the most interesting, is the way in which the pipe was transported from shore to laying point in the bay and the method by which it was dropped into the water after bolting-up.

The castiron pipe, in 16-foot joints, was floated from the mainland shore to the point of operation in eight-joint sections on steel pipe pontoons. These pontoons consisted of two 125-foot lengths of 14-inch welded casing, the ends of which had been sealed by orange peel welds. One end of each pontoon was fitted with a 1¼-inch nipple and a 1¼-inch plug valve for the injection of air. Twenty pounds of air was carried in each pontoon to enable the operators to discover leaks. Three double pontoons were used in the job, one pontoon at the pier being loaded, one carrying its load to the laying pontoon, and a third assisting the laying pontoon in holding the constructed line at the

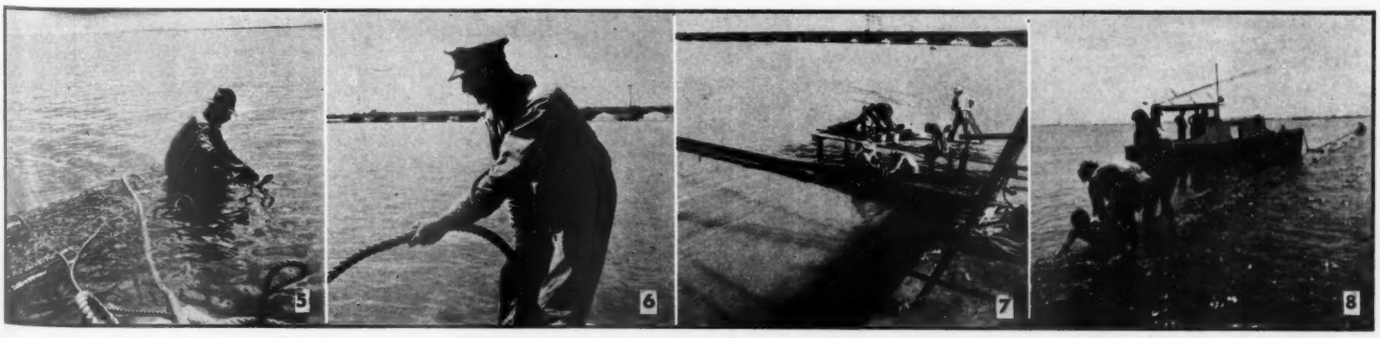


Fig. 5—Workman on end of newly arrived carrying pontoon lashes anchor rope to the pontoon to prevent tide and wind from swinging it out of alignment. Fig. 6—Raymond O. Stuart, street department foreman for Galveston division, Texas Cities Gas Co., in charge of the marine laying crew passes out anchor rope in preparation to receiving and lining up carrying pontoon. Fig. 7—Eight-inch cast iron pipe being loaded on carrying pontoon at pier. The next two-joint section is being bolted to the first section. The two-joint section being bolted to first section is being held in position by derrick hoist. Fig. 8—Workmen have completed stabbing and are ready to bolt up newly arrived eight-joint section while tug and workmen at far end keep pipe in alignment

top of the water. Flexibility of the ball point pipe, manufactured by the American Cast Iron Pipe Co. of Birmingham, Ala., was a deciding factor in the company's decision to replace steel with cast iron pipe. The ball joint permits a 15-degree deflection and this flexibility greatly facilitated underwater pipe laying. The pipe has a working pressure of 800 pounds per square inch, but operating pressures on the new line will not normally exceed 100 pounds. In addition the weight of the pipe itself eliminated necessity for anchorage devices.

It will probably be easier to make the complete operation clearer by starting at the beginning of the process at the mainland shore and carrying the reader through to the final operation of dropping the pipe into the sea. A 225-foot pier 7 feet wide was built from the shore out into the bay. This pier was constructed principally of 2 by 14 planking and 6 by 6 piling and stringers. It proved sufficiently strong to support 27 tons of cast iron pipe.

Panorama view of mainland activities. This shows construction pier, loaded carrying pontoon lashed to tug about to leave for laying position in the bay, and steel barge mounted with derrick hoist

The sea end of the pier was widened to 19 feet where the first process of bolting together two joints of cast iron pipe was completed. When two joints were bolted together, a derrick mounted on a steel barge anchored opposite the pier lifted the joints off the pier and onto the pontoons which carried the pipe in the following manner:

Twelve 1¼-inch rope slings were tied around two 125-foot lengths of 14-inch pipe which comprised a carrying pontoon. The cast iron pipe was laid between the two lengths and supported by the rope slings.

After 1 two-joint section had been loaded onto the pontoon, another two-joint section was lifted into place by the derrick. When this was bolted up, the pontoon would be moved by manpower and another two-joint section lifted from the pier to the pontoon. The pontoon was floating at this point in waist-deep water alongside the pier and workmen standing in the water stabbed and bolted-up. This process continued until eight joints of pipe, measuring approximately 128 feet in length and weighing approximately 3 tons had been loaded onto the pontoon. With this load the pontoon was 17 per cent buoyant.

Stabbing and bolting-up of two lengths of pipe on the pier required three workmen 9 minutes and 35 seconds from the beginning of the cleaning off and greasing of the balls and sockets until the two-joint section was ready to be lifted upon the pontoon. Stabbing and bolting four of these two-joint sections on the pontoon required an average time of 21 minutes and 35 seconds with two workmen bolting and one man making the bolts ready.

Light Tug Pushed Pontoon

A light tug was made fast to the pontoon thus loaded and pushed it out into the bay where the actual laying was taking place. The longest haul for the tug was 1¾ miles and the shortest haul was 1,000 feet.

The actual marine pipe laying equipment consisted of a pipe laying pontoon. This piece of equipment was constructed in the company shops and consisted of two 18-foot lengths of 17-inch steel pipe made air tight and tied together by four 6 by 6 wooden joists, held in place by U-bolts. A steel pipe horse was mounted on this pontoon for the purpose of supporting chain hoists used in supporting and lowering the pipe. Tools and accessories were kept handy and readily movable on a raft 8 feet square. This was buoyed by 14-inch steel pipe pontoons made air tight. The third piece of equipment consisted of an outboard motor equipped row boat.

Calculating wind and tide was an integral part of the engineering task necessary in successful completion of the Galveston Bay construction job.

Two operations were necessary to bring a loaded pipe-carrying pontoon into position preparatory to stabbing and bolting. As the tug and its loaded carrying pontoon approached the end of the line already constructed, a workman on the tug threw a rope to three workmen on the laying pontoon, which straddled the constructed line and assisted in holding it at the top of the water. With this rope the workmen pulled this end of the carrying pontoon up to the open end of the line already laid.

At the same time the foreman of the marine laying job and a laborer in the rowboat made contact with the pontoon the laborer jumped aboard the pontoon with an anchor rope in his hand. By means of this anchor rope he then pulled this end of the newly arrived carrying pontoon into alignment with the line that had already been laid. After proper alignment the anchor rope was made fast to the pontoon and its load of pipe so that tide and wind would not swing it about. With the newly arrived pipe and its carrying pontoon in proper alignment the workmen then by means of hand ropes pulled it into position for stabbing and bolting-up.

At this point it must be explained that the laying pontoon was astraddle the constructed end and assisted a second carrying pontoon in holding the constructed line at the top of the water. After the newly arrived section had been bolted into place, the foreman in his rowboat used an ordinary hand axe to cut the rope slings up to about the center of the second carrying pontoon.

It might be well to explain here that the 1¼-inch rope slings which supported the cast iron pipe between the carrying pontoons were looped at each end and these looped ends were lashed together with quarter-inch ropes which were cut when the pipe was ready to be dropped into the water. By this means it was possible to save the 1¼-inch rope sling, destroying only a small portion of the less expensive rope.

The Coffing chain hoists on the steel horse of the laying pontoon were used to lower the pipe into the bay easily and thus avoid sudden drops when slings were cut. When the pipe had been eased down into the water as far as the newly arrived carrying pontoon allowed, plus several rope slings on the second carrying pontoon, the chain hoists were then removed from the pipe and the laying pontoon was walked to a position astraddle the newly arrived laying pontoon. Here the chain hoists were again fastened to the line and the remaining slings on the second laying pontoon were cut loose, allowing more of the pipe to drop into the water and releasing the carrying pontoon to be towed back to shore for reloading.

After the second pontoon had been released and the tug had picked it up and started for shore with it, the chain hoists were again slacked, allowing the full strain of the free end of the line to be supported by the carrying pontoon. This laying pontoon was again released and walked forward to the end of the constructed line where it was fastened once more to the line and made to assist the carrying pontoon in supporting the constructed line at the top of the water. Here it remained until the next loaded pontoon arrived and the process was repeated. In other words, one carrying pontoon remained at the laying position and one returned to the construction pier to be loaded while the third pontoon was being towed out to laying position.

As the pipe line approached shallow water nearer the shore and left the current set up by tidal action, three-quarters inch pipe was used to hold the laying pontoons in alignment instead of anchors. These pipes were stuck into the mud and held upright against the floating pontoons.

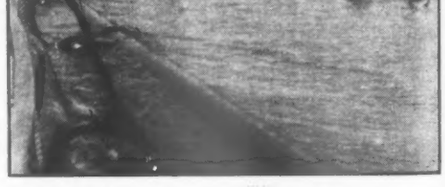
The first portion of the job consisted of laying the new line from the section previously laid across the Intracoastal Canal to the section previously laid from the island shore. Both connections, that is the one with the channel crossing and the one with the island line, were made by a deep sea diver. A third underwater connection was also necessary on the mainland end of the channel crossing.

Diver on Bottom

The diver also had the additional task of jetting the trench for the pipe which lay on the bottom of the bay. This was accomplished by means of a powerful stream of water picked up from the sea by a centrifugal force pump powered by an automobile engine and jetted against the mud and slime of the bay floor directly beneath the pipe. As the stream of water removed the mud and earth the pipe settled into the ditch.

Backfill was accomplished by action of the tide and water movement. With the pipe in the trench covered with mud and sand, it is relieved of all stress and strain which would otherwise be placed upon it by storms, tidal movement, and normal wave action.

Three underwater fittings and connections were necessary for completion of the job—one on either side of the channel and one off the island shore. There was no underwater work on the mainland connection because the new pipe was laid continuously from the bay up to the gate valve box on shore. Only one welding job was necessary in the entire 8,000 feet when it was necessary to manufacture a correct length of pipe



Tug and loaded pontoon approach laying pontoon. Workmen about to cast line to men on laying pontoon. The line was used to pull the newly arrived pontoon into stabbing and bolting position

to connect the island line with the newly laid pipe line from the channel crossing. The actual connection and bolting-up was done under water by the diver.

More than 6,375 bolts were used in the entire job, and 10,000 feet of rope and twine, varying in size from a fraction of an inch to 1¾ inches. Hundreds of marine knots had to be tied in making pontoon slings, anchor ropes, mooring lines and other marine gear necessary for this job. This work was done by company employes under the supervision of E. G. Lege, superintendent of distribution for Texas Cities Gas Co., in Galveston, who had charge of the shore crew.

Principal engineering and operating problems were worked out by P. E. Nicholls, manager of the Galveston division of Texas Cities Gas Co.; H. D. Portwood, chief engineer for Community Natural Gas Co. and Texas Cities Gas Co.; and L. B. Denning, Jr., vice president and operating manager of Community Natural and Texas Cities.

Design of Open Type Main Line Station Manifold

By JOHN G. NORTON
Chief Mechanical Engineer, Magnolia Pipe Line Co.

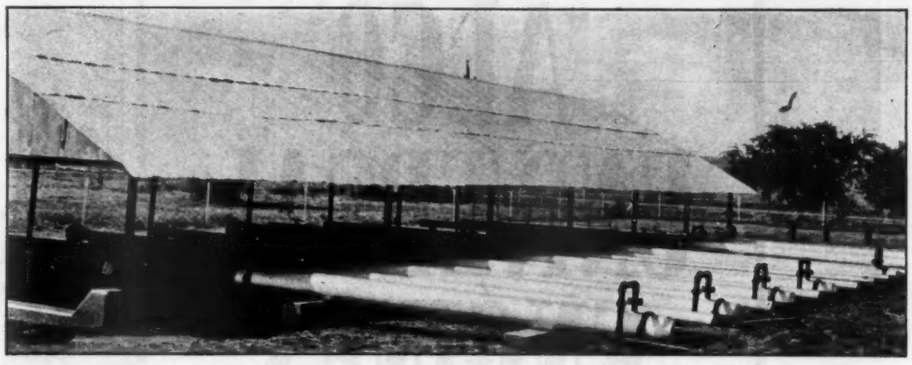


Fig. 2—General arrangement of coolers on concrete footings

Many unique and new ideas have been incorporated in the design and construction of this open type main line station manifold.

On large pipe line systems where several lines are used to transport oil, and especially in stations built years ago which were designed with numerous small capacity pumping units, the use of a large manifold was necessary to facilitate the handling of various crudes. With the advent of large capacity units and larger lines the size of these manifolds has decreased very noticeably.

The average size manifold for a large main line station handling approximately 100,000 bbls. of crude oil per day requires a building approximately 36 feet by 78 feet and contains in the neighborhood of 100 various sizes of high- and low-pressure gate valves, depending of course on the number of out-going lines, units and the number of storage tanks in service.

Generally the manifold pit is constructed about 10 feet below the ground level and is built of concrete to about 1 foot above ground level. The building over this manifold pit is generally about 10 feet high and built of steel and corrugated galvanized iron which makes it fireproof.

Before the advent of acetylene and electric arc welding these manifolds were made of screwed pipe and fittings, but in later years have been superseded by acetylene or arc welded manifolds. These manifolds are either made up at the site or are shop fabricated and assembled on the location. Needless to say that a large manifold is a very expensive and difficult piece of construction, especially when it is installed in a deep manifold pit.

We had occasion about one year ago to design and install a manifold at one of our main line stations at Addington, Okla., which was originally constructed without a centralized manifold. After careful thought and preparation we decided to build an open type manifold at a depth slightly below ground level. We also incorporated in our layout the use of suction coolers in conjunction with our manifold for the cooling of circulating water for our engines.

Plans and specifications were drawn up and submitted to several firms for bids on all headers, etc., for the manifold. Figure 1 shows detail of header construction. All pipe used, whether for suction or discharge and regardless of size, was extra heavy lap welded. Slip-on and blind flanges for suction line service were Series 30. Slip-on and blind flanges for discharge service were Series 40. All gates were of one make; for low-pressure service 700 pounds water test and for high-pressure service 1,600 pounds water test. All welding nipples between upper and lower headers were cut special to right lengths to eliminate any extra welds. These welding nipples were fabricated to true shape at the welding points so as to have a uniform weld throughout. All slip-on flanges of both 30 and 40 series had three beads of welding (one small and two large) on outside edge of flange and pipe and were finished on the inside with one small bead where the end of pipe joins face of the flange.

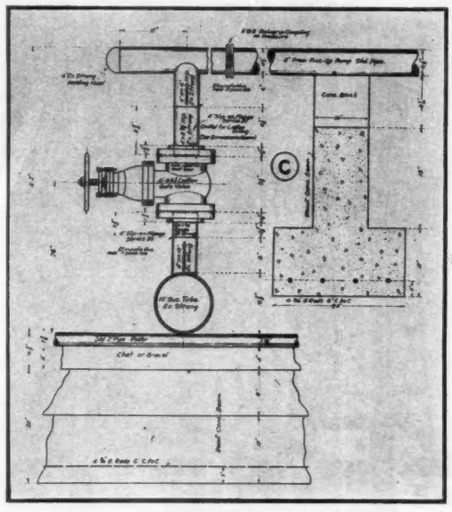


Fig. 1—Details of header construction

All headers were made in such lengths that they were easy to handle. All lower and upper headers were so drilled and marked that all hole alignments were perfect. The headers were joined together by Rolagrip couplings of the wide design, and these were also used with the idea of expansion of the headers as well as for the coupling use. The headers were so designed as to allow for future enlargement with blind flanges used at the required points.

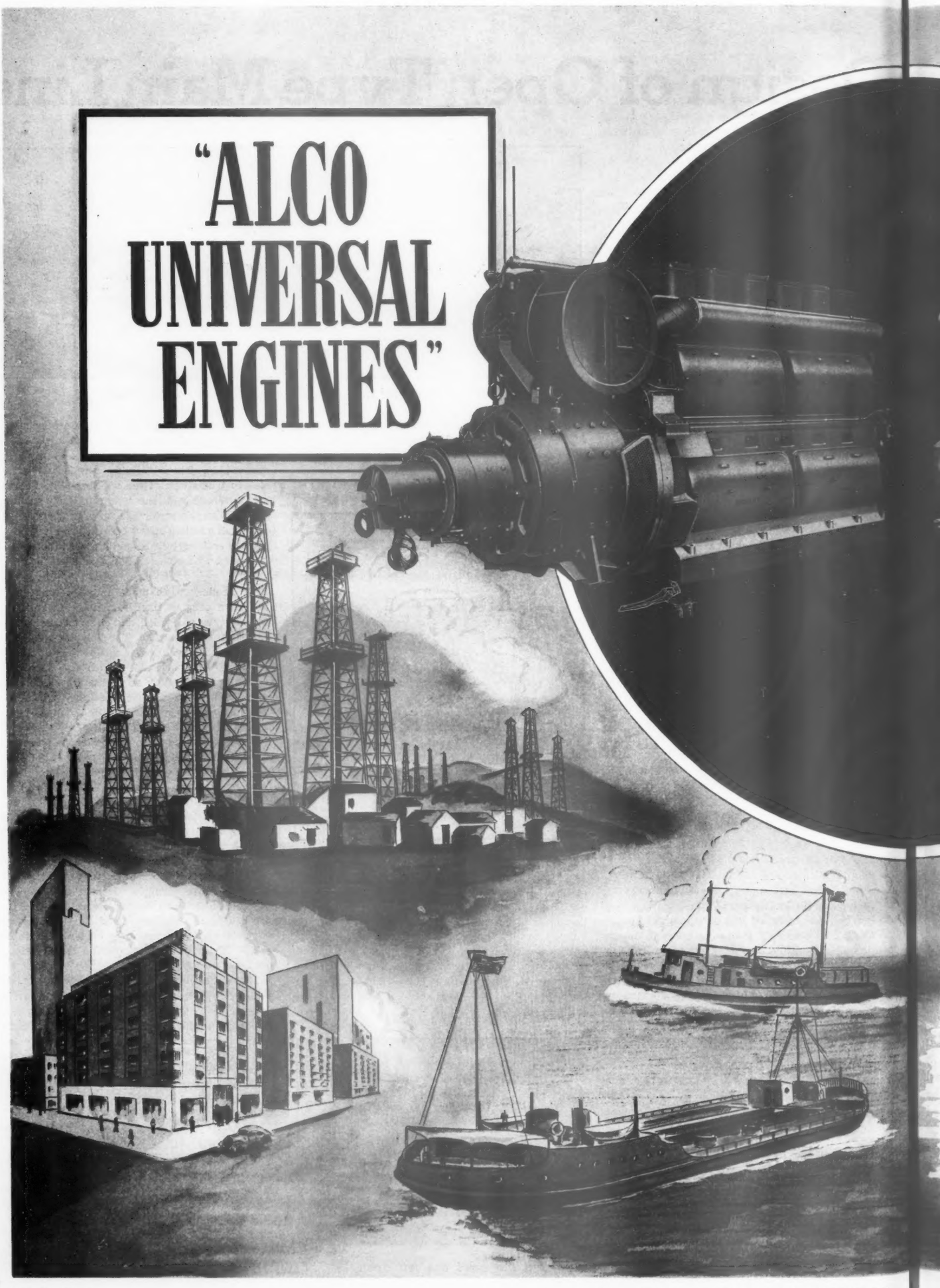
The concrete walls and header footings were all poured to exact heights and leveled before the manifold headers were installed. Two-inch extra heavy pipe was used on the various footings for rollers so that the entire manifold assembly could move as required by temperature changes. Rolagrip couplings were used at side of manifold upper header toward the suction coolers to connect up lines leading to these coolers. This feature also shows the necessary movement required by temperature changes. It will also be noted that the coolers are common straight flow type with Victaulic couplings used on both ends for contraction and expansion of coolers. These coolers are all in line and all rest on two continuous concrete footings.

The entire manifold, gates, coolers, etc., was installed in three days. A 20-hour shutdown was necessary to cut in various suction, discharge and suction pump lines to the manifold arrangement.

As shown by photographs we later erected a steel shed over the manifold pit and this was made almost entirely of 2-inch and 4-inch second-hand pipe and covered with corrugated galvanized iron. All second-hand material was used in the construction. Figure 2 shows general arrangement of coolers on continuous concrete footings. Figure 3 shows interior of manifold.

This manifold has been in operation for nearly one year with only one failure. During a severe cold spell last winter one 4-inch low-pressure gate valve cracked because of the 4-inch idle header to same not being properly drained at the time. No other trouble has occurred during the summer or winter periods. The manifold headers, coolers, etc., were furnished by the Henry Vogt Machine Co.

Fig. 3—Manifold in pit protected by roof but the sides are left open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THE Alco Universal is a four-cycle, 12½ x 13 Diesel engine. It is supplied in 6 and 8 cylinders, with or without supercharger, in a H.P. range from 500 to 1200... It is a proven, medium-weight, compact, rugged, heavy-duty, low-maintenance Diesel engine of very simple construction combined with a low installation cost . . . Six years experience with many installations most satisfactorily performing in diversified fields has aptly christened it as truly a universal engine.

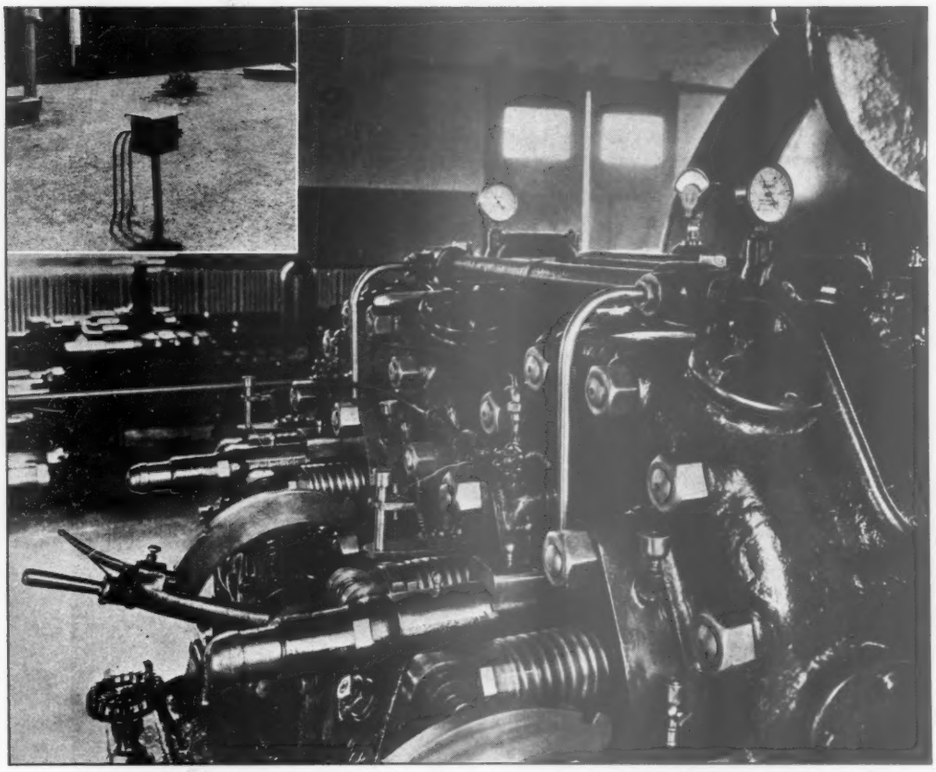
Alco DIESEL ENGINE DIVISION

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET, NEW YORK CITY

PRACTICAL SUGGESTIONS

Edited by Paul Reed



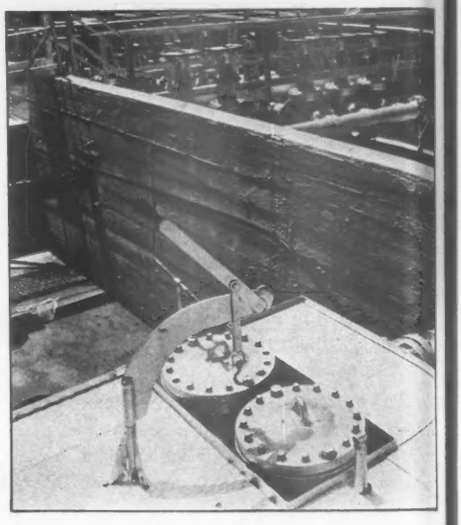
Device for Shutting Down Horizontal Engines

For shutting down a horizontal engine in an emergency, from a point outside the building, a device has been installed which does this by holding the exhaust valve open. By this means, the engine is stopped more quickly than it is by shutting off the fuel. When the engine is to be shut down, by the method described here, a man pulls the end of a wire which terminates in a box, mounted on a pipe support, at a safe distance from the building. A wire to each engine passes through a separate conduit to a "Y" connection near the exhaust valve, where it is attached to a wire going to each of the two cylinders; at the end of each of these wires is a small horizontal pin inserted in a hole in a larger vertical pin, which it holds in a suspended position; the larger pin is held in a vertical position by being inserted through holes in two plates. When the wire is pulled, the small pin is pulled out of the hole in the larger vertical pin, allowing the vertical pin to drop to a position where it holds exhaust valve open.

Stomper for Pushing Down Pipe

In laying pipe lines through swamps on the Gulf Coast it sometimes is difficult to get the pipe to the bottom of ditches. Stompers were made from 3-inch timbers, which were bolted together with U-bolts and grooved at the bottom to fit the face of the pipe. The face of the stomper was padded with sacks filled with saw dust to prevent damage to the coating of the pipe. By rocking a tractor back and forth on top the stompers the pipe was driven down

For Lifting Strainers

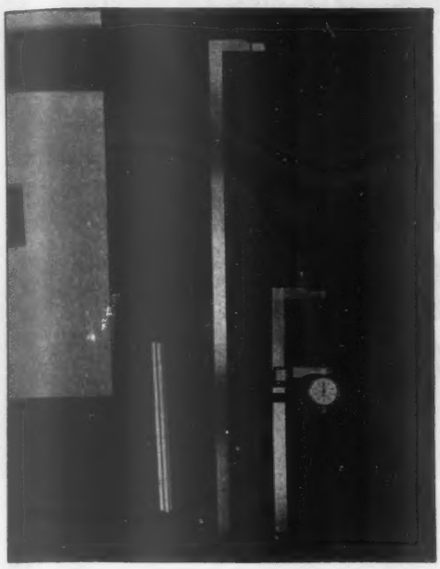


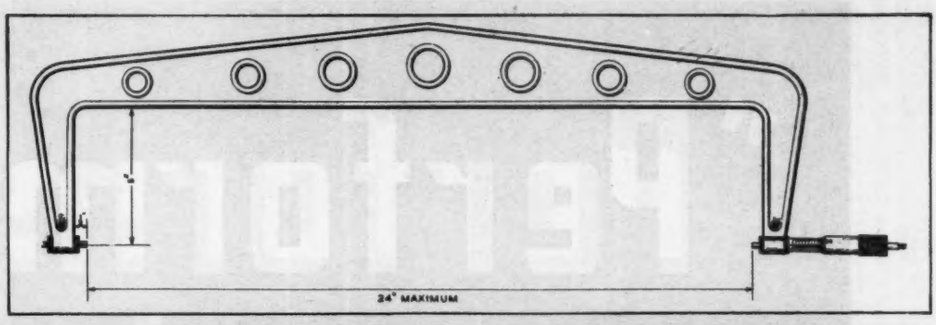
A davit with lifting device has been installed by a gasoline pipe line company to facilitate the lifting of strainers at times when it is necessary to remove and clean them. The lever has been made in such a way as to lighten the labor of lifting as much as possible; after being lifted out the strainer is readily swung to one side.

Tank Farm Valves

When the chief engineer of the station of a major pipe line company decides that a valve shall not be used, he has the wheel removed and laid on the ground with the stem sticking between the spokes; it is wired in this position. General instructions at the station are that the valve is not to be used for any reason until the chief engineer orders the wheel replaced on the stem. Every valve has a metal tag with a number on it, which is recorded in the central office. A sign at each valve shows the number of turns required to close it, insuring correct operation.

Stress Gauges for Diesel Engine Crank Bolts

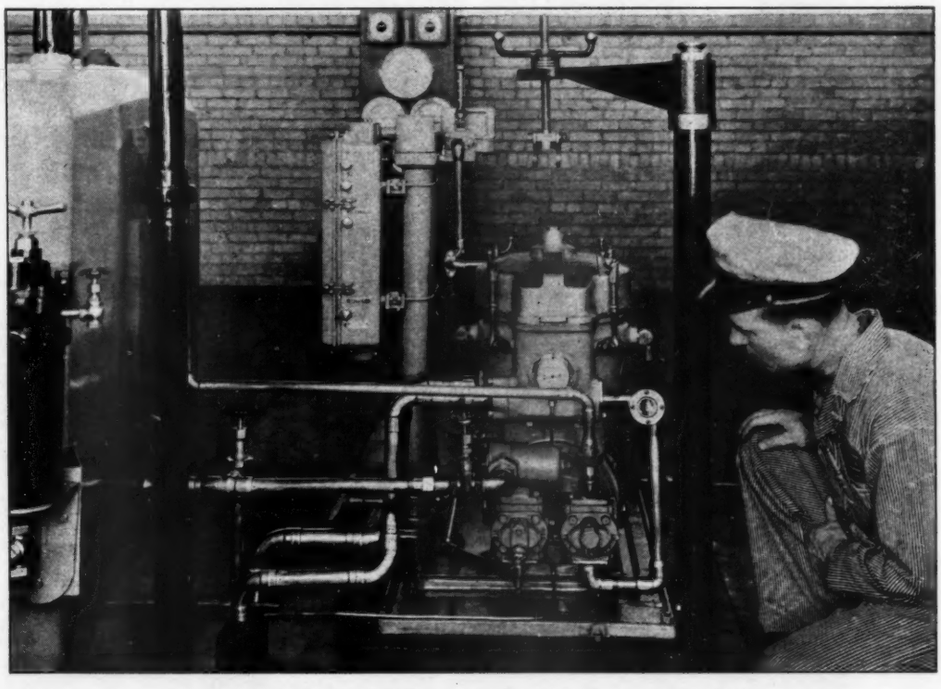




Stress gauges designed by pipe line engineers and made for their own use within the past year for checking the stretch in Diesel engine crank bolts. The bolt is installed in the bearing with the nut in place; the strain gauge is then installed on the bolt and the nut is tightened. The amount of stretch is predetermined to give the desired bolt stress. The amount of stretch to be allowed for each type of bolt is determined by engineers in the master mechanic's office and prescribed for the machinists to follow. Companies using these gauges aim to set up crank bolts with a stretch of 50 to 60 per cent of the elastic limit of the bolt. One company making tests found that certain crank bolts were set up with a pressure of over 70,000 pounds per square inch when 12,000 to 15,000 pounds pressure was required. Attention has been called to the fact that a large number of breaks have occurred because the bolt was not set up tight enough; in these cases, as a result, breakage was due to fatigue. The use of stress gauges makes possible the adoption of practices leading to greater uniformity.

Jig and Gauge for Crank Bolts

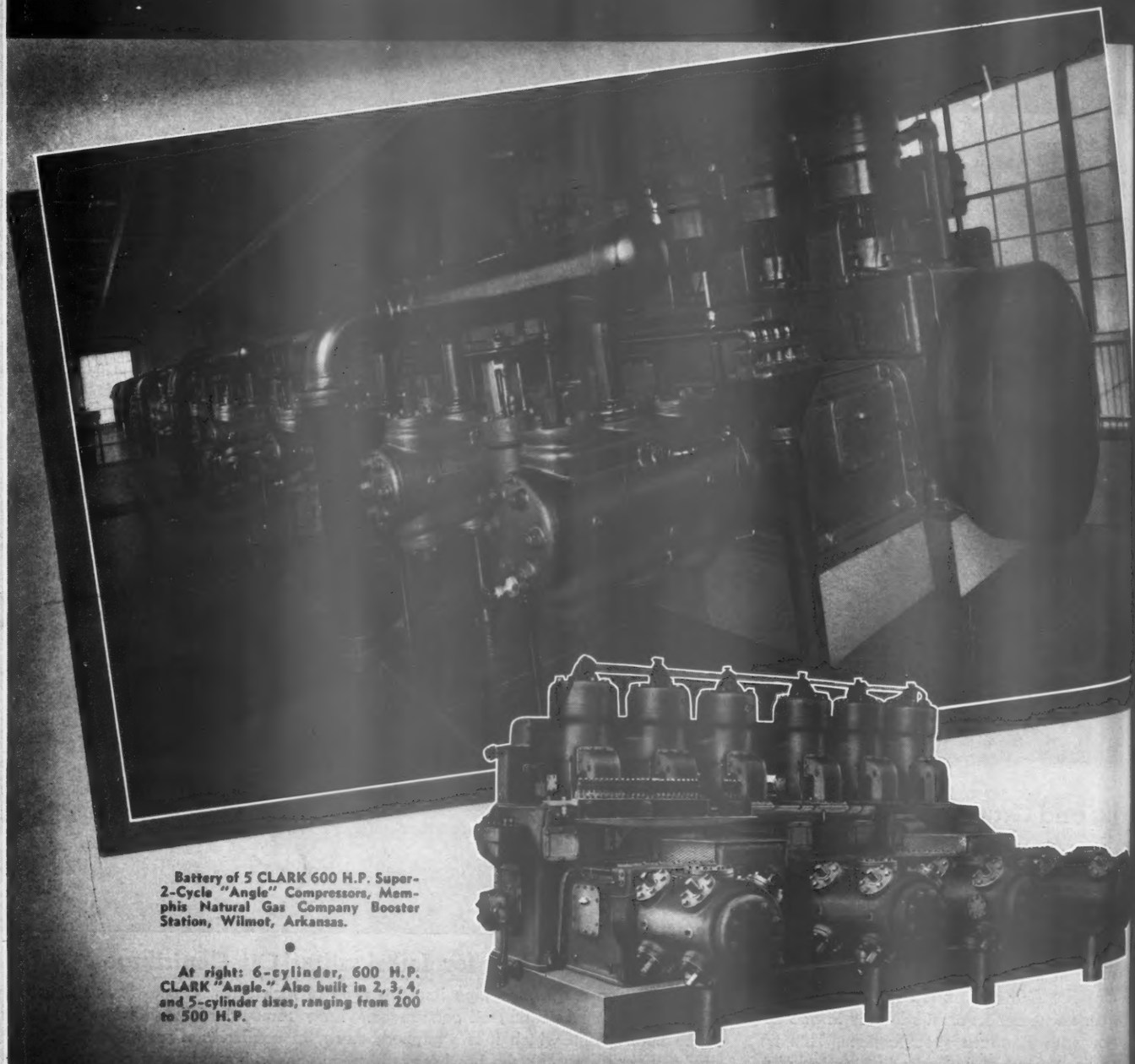
For testing the elastic limits of a bolt, a jig has been made from cold-rolled shafting, welded to a suitable plate for attaching to a building column. At stations where the building is light, holes for attaching the plate are drilled in the bed plate of an engine. The crank bolt shown here is being tested to determine whether its elastic limit is in accordance with standard specifications. This jig has been used at the main line station of a major company for seven years for testing new bolts and bolts in service.



Davit for Lubricating Oil Centrifuge

At stations on a gasoline pipe line this type of jack screw davit is used for removing the bowl from the lubricating oil centrifuges. Easy removal of the bowl is facilitated by the yoke hooks, with which it is equipped; these, in combination with the bronze bowl yoke, make it possible to lift the bowl from the machine without danger of bending the driving spindle or of dropping the bowl. Stream line copper tube fittings are used for the assembly of all oil lines connected with the centrifuge installation at this station.

"Performance exceeded our



Battery of 5 CLARK 600 H.P. Super-2-Cycle "Angle" Compressors, Memphis Natural Gas Company Booster Station, Wilmot, Arkansas.

●

At right: 6-cylinder, 600 H.P. CLARK "Angle." Also built in 2, 3, 4, and 5-cylinder sizes, ranging from 200 to 500 H.P.

of the station expectations"

writes H. C. Wallace,
Vice-President, Memphis Natural Gas Co.

IN response to an inquiry regarding the performance of the CLARK "Angle" Compressors at the Wilmot, Arkansas, Booster Station of the Memphis Natural Gas Company—H. C. Wallace, Vice-President of the company, writes us:

"Replying to your inquiry concerning the performance of Clark "Angle" Compressors and our opinion of this equipment:

"As you know, in the summer of 1937 we constructed a compressor station on our main line at Wilmot, Arkansas, equipped with five 600 H. P. Clark "Angle" machines. This station was completed in the fall and placed in service December 1, and was operated at capacity from then on through the period of our heavy peak demands until about March 15. During this time we experienced no operating difficulties of any kind, and the performance of the station generally exceeded our expectations. We found this equipment particularly adaptable to our service due to the flexibility of the units and the short time required for them to come on and go off the line.

"By the use of this equipment at this particular point we were able to effect a considerable saving, due to the compact design of the plant, which was made possible by the use of this particular type of equipment.

"This summer we have inspected the compressors and gas engines carefully and find that there has been no appreciable wear due to the season's operation, and nothing but ordinary maintenance has been required. As a result of this first year's experience, we believe that your prediction regarding low maintenance cost at this station will be realized."

CLARK "Angles" are bringing users three great savings: On Installation cost because compact design saves on transportation, foundations, and building; on Operation because CLARK Super-2-Cycle Fuel Injection saves 1/3 on fuel, giving 4-cycle fuel economy; on Maintenance due to the rugged simplicity of CLARK 2-cycle design.

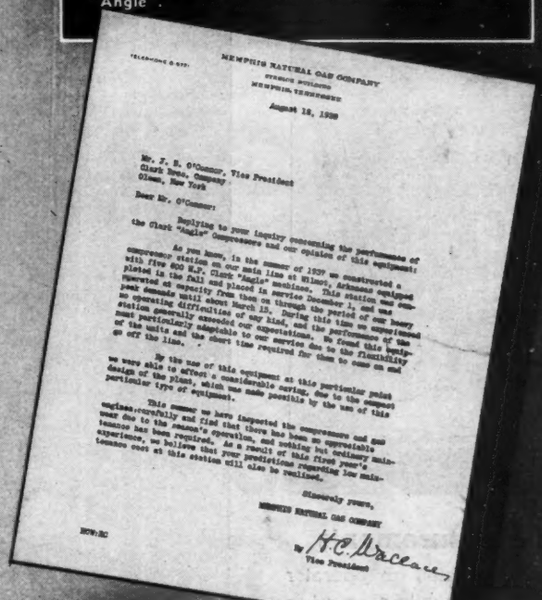
Write for our new catalog; also our 20-page booklet giving complete engineering description of the Wilmot Station.

CLARK BROS. COMPANY . . Olean, New York, U. S. A.

Export Office: 30 Rockefeller Plaza, New York. Midcontinent Sales Offices and Warehouses: Tulsa, Okla.; Dallas and Houston, Texas. West Coast Office: Smith-Booth-Usher, 2001 Santa Fe Ave., Los Angeles. Foreign Offices: 72 Turnmill St., E. C. 1, London, England; 4 Str. General Poetas, Bucharest, Roumania.

CLARK

Main Compressor Building and Meter House, Wilmot Station. Note saving in size of building made possible by compact design of the CLARK "Angle".



MEMPHIS NATURAL GAS COMPANY
GENERAL OFFICES
MEMPHIS, TENNESSEE

August 18, 1938

Mr. J. E. O'Connor, Vice President
Clark Bros. Company
Olean, New York

Dear Mr. O'Connor:

Replying to your inquiry concerning the performance of the Clark "Angle" Compressors and our opinion of this equipment:

As you know, in the summer of 1937 we constructed a compressor station on our main line at Wilmot, Arkansas equipped with five 600 H.P. Clark "Angle" machines. This station was completed in the fall and placed in service, and was operated at capacity from then on through the period of our heavy peak demands until about March 15. During this time we experienced no operating difficulties of any kind, and the performance of the station generally exceeded our expectations. We found this equipment particularly adaptable to our service due to the flexibility of the units and the short time required for them to come on and go off the line.

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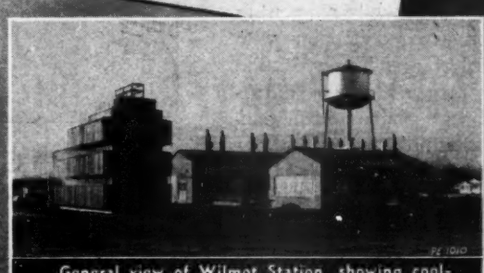
Sincerely yours,
MEMPHIS NATURAL GAS COMPANY
By H. C. Wallace
Vice President

HCW:BC



General view of Wilmot Station, showing cooling tower, main compressor building and auxiliary building.

Cylinder Liner Gauge

This self-supporting cylinder liner gauge requires little skill to manipulate. It is used to supplement the results of inside micrometer determinations. Because of its wide encompassing range, it is capable of indicating irregularities which might be overlooked while making visual observations. On the liner rim are stenciled the figures, 14.000 and 14.062, which indicate that the liner was bored one-sixteenth inch oversize.

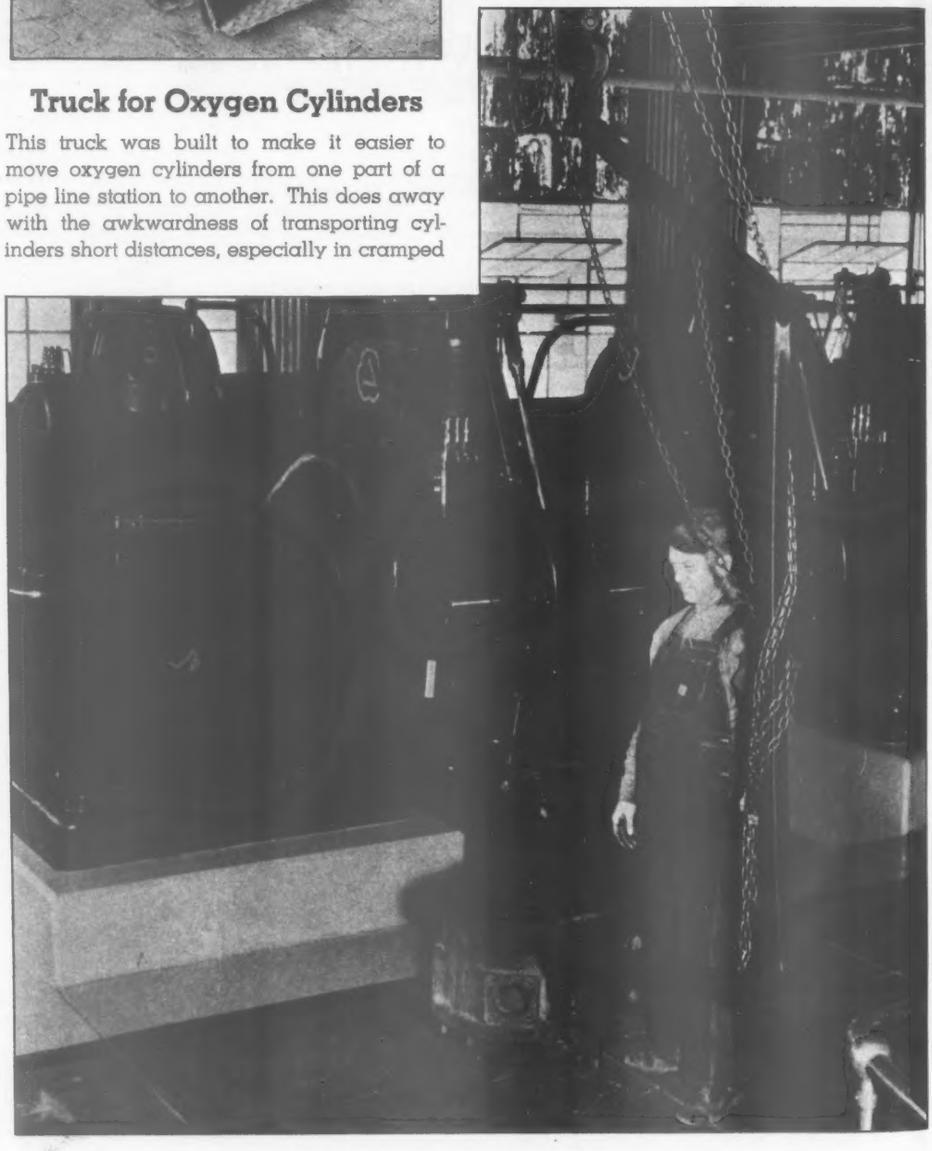
Crankshaft Measurements

In overhauling Diesel engines an operator uses 25-ton hydraulic jacks while measuring crankshaft distortion and deflection with strain gauge and dial gauge. The hydraulic jacks which apply pressure to the crankshaft are equipped with shoes which conform to the crank journal; the jacks are equipped with bourdon gauges, invisible in illustration, which are calibrated in tons to indicate the effective load placed upon the shaft. Two jacks are used in checking each shaft; there is one on either side of the shaft being measured. It is claimed that this method is much faster than the conventional one using the pull-down clamp arrangement.

Truck for Oxygen Cylinders

This truck was built to make it easier to move oxygen cylinders from one part of a pipe line station to another. This does away with the awkwardness of transporting cylinders short distances, especially in cramped spaces. The truck has been made so that the cylinder may be picked up in an upright position, carried at a slant, and set down standing up straight. Corrugations on the lower plate guard against the cylinder slipping while being carried.

PRACTICAL SUGGESTIONS



Gooseneck for Removing Exhaust Valves

The chief repairman at a compressor station on a gas line made a gooseneck arrangement for removing exhaust valves in half the time formerly required. It hangs by a three-fourths inch clevis from a hook suspended by a chain from a traveling crane. The main bar from the clevis to the large fork-shaped holder at the bottom is made of 2 by 2-inch steel; distance from the clevis to the first bend of 135 degrees is 36 inches; outside measurement of vertical part of the bar is 70 inches; outside measurement of lower horizontal part of the bar is 32 inches; the fork-shaped holder is made of three-fourths by 2-inch steel.

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Stationary—Portable Skidded—Trailer Units

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CAPACITY	PRESSURE	S. U. S. VISCOSITY

IN THIS SQUARE NOTE CAPACITY, PRESSURE AND VISCOSITY OF FLUID YOU ARE INTERESTED IN PUMPING

Without obligation please send me a complete catalog describing your High-Pressure Rotary Pipe Line Pump. I am especially interested in the capacity pump checked at left.

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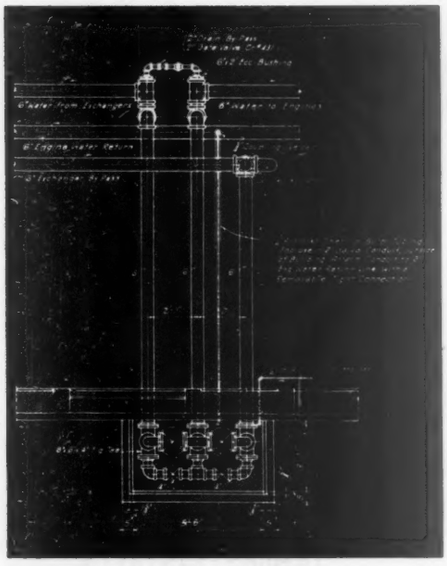
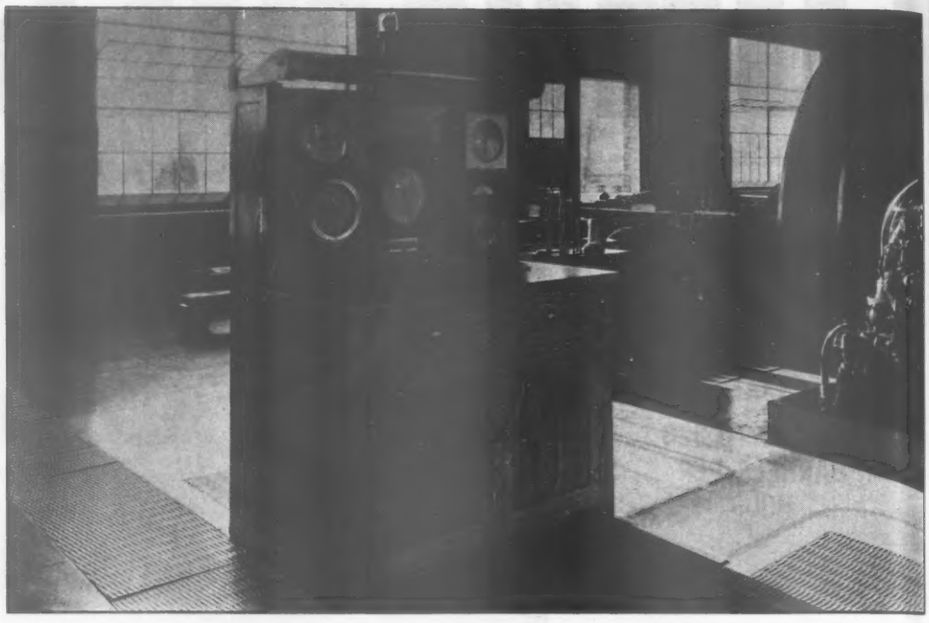
PRACTICAL SUGGESTIONS



Temperature Control

At a pipe line station where engine water was frequently too cold for efficient operation, engineers made provision for injecting warm water in the stream, returning to the engines, by having connections installed for this purpose with a recording temperature controller.

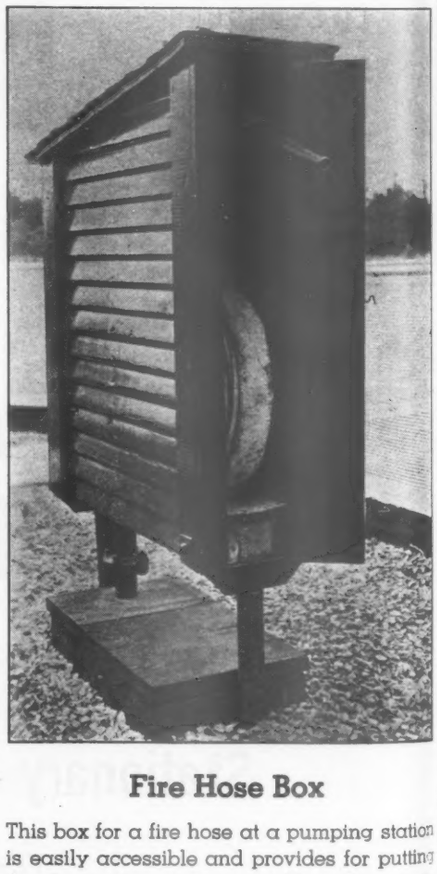


Desk With Instrument Board

This convenient desk, located in a central position in the pump room, provides a panel for mounting indicating and recording pressure gauges, recording gauge for orifice meter, clock, and pyrometer for showing jacket water temperatures.

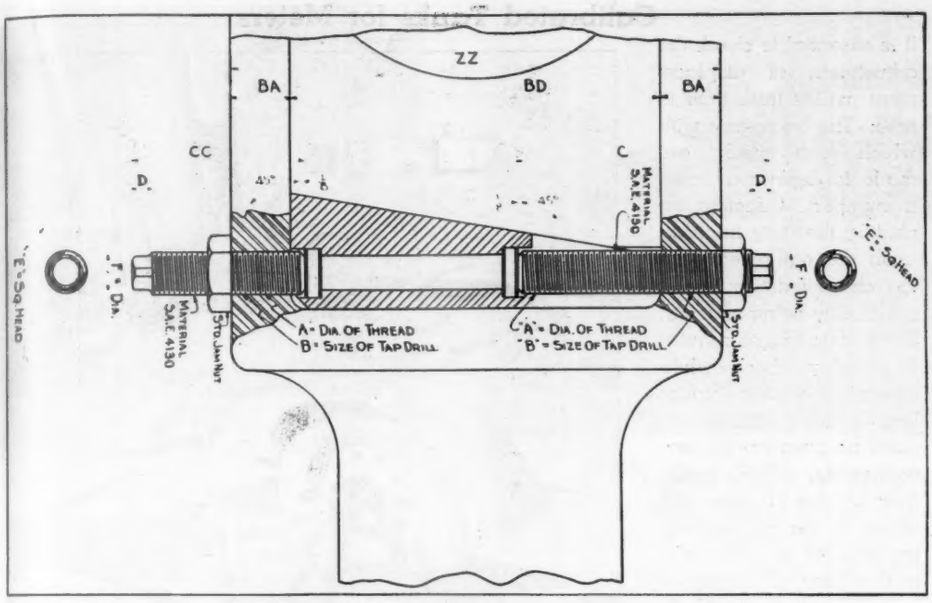
Cutters for Large Pipe

The division foreman on a crude oil trunk line in Kansas needed a cutter suitable for large pipe in the field. He designed the device shown which was made by the machinist. The cutter is in two segments so it can be placed around the pipe at any point desired; each segment has several cutting blades so it is not necessary to rotate the cutter around the pipe.



Fire Hose Box

This box for a fire hose at a pumping station is easily accessible and provides for putting the hose into action quickly when it is needed. The nozzle is supported by two pieces of wood, fastened inside, which make it possible for the nozzle to be at a point just inside the box from which it may be readily pulled out. The hose is coiled so that it is pulled out in a straight line without kinking.

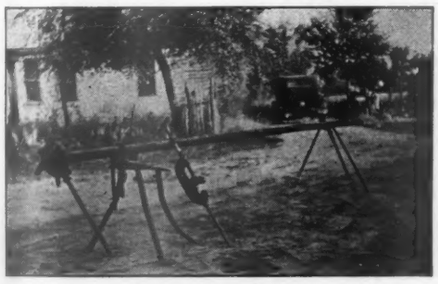


Wedge Bolts in Pump Crossheads

The conventional type of wedge bolt, in wedge adjusted bearings on pump crossheads, fail frequently due to fatigue resulting from shocks while under stress. The bolts in this sketch are kept under compression instead of tension and will not fatigue. Sufficient room must, of course, be available in crossheads to permit the use of this type of bolt.

Ring Belt Lowered

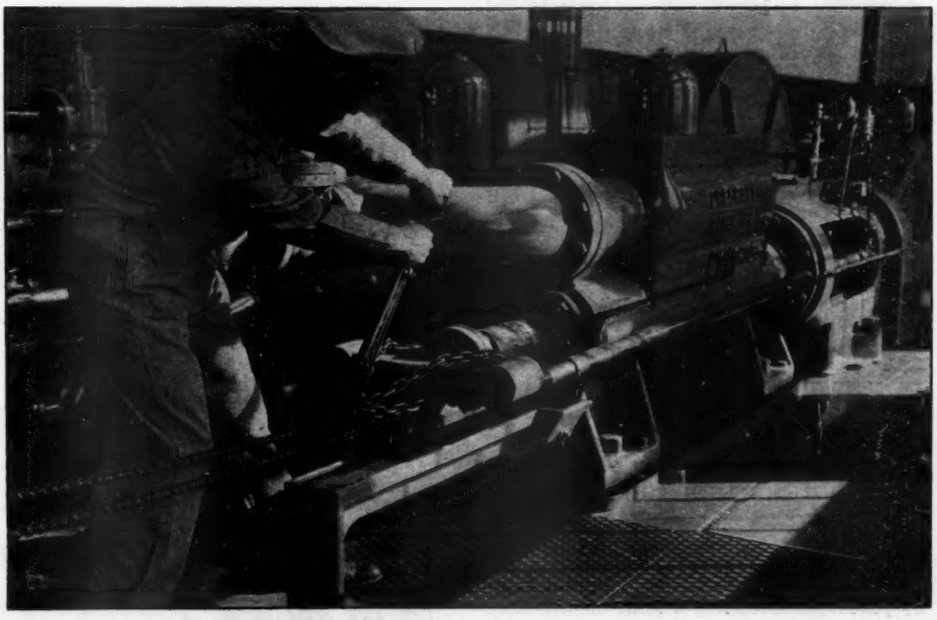
At pipe line stations where there had been considerable trouble due to stuck piston rings, satisfactory piston service was had with pistons with lower ring belts. The ruler held in the engineer's hand shows that space above the ring belt was doubled, from 1 inch to 2 inches. The piston, with the higher ring belt, carbonized the lubricating oil with the result that heavy deposits of residue quickly caused all the rings to stick fast in their grooves. The subsequent blowing by of the products of combustion made it imperative that the piston be pulled frequently for cleaning. The lower ring belt of the redesigned piston resulted in decreased ring temperatures; ring sticking tendencies were definitely eliminated. Before the pipe line engineers redesigned the piston, trouble had been blamed on the rings and the lubricating oil. The experience of this operator is described here to show a solution reached with certain equipment, with the realization that all piston ring trouble cannot be thus cured.



PRACTICAL SUGGESTIONS

Field Pipe Vise

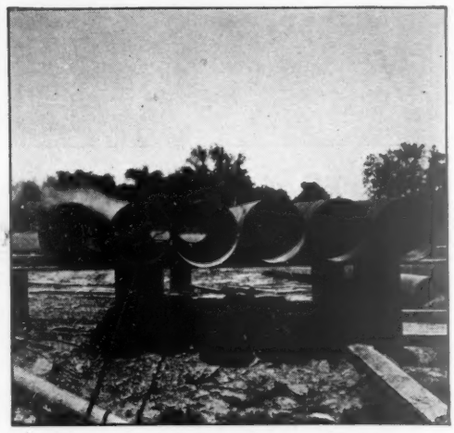
A chain vise stand may be easily made from scrap material found on a lease. A 10 by 12-inch piece of steel cut from an old brake band, an old seven-eighths inch rig bolt or sucker-rod, some scrap pieces of 1-inch pipe, and three five-eighths by 1-inch bolts with nuts are all that is required. The seven-eighths inch rod is cut into three 2- or 3-inch pieces which are welded to the steel plate. These pieces are inserted into the legs made of 1-inch pipe, bent with enough flare to keep the stand from being overturned easily; the legs should be long enough to allow clearance for a full turn of the pipe cutters. Studs are provided for the upper ends of each leg by burning a hole, over which, a nut is welded; a bolt in the nut serves as a stud. A one-eighth to 4-inch chain pipe vise is brazed or bolted to the steel head of the stand. A second stand or tripod should be made to support the opposite end of the pipe. This may be made by welding two legs to the split half of a 4-inch collar; the third leg is made demountable. The convenience with which pipe may be cut and threaded will save enough labor to make it worth using.



Removing Pump Plunger

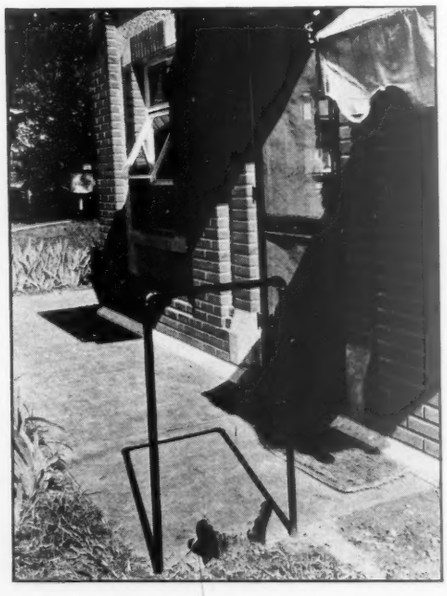
One man can easily handle the operation of removing a pump plunger, as shown in the photograph, with a minimum of effort, by using 3-ton roller chain hoist

PRACTICAL SUGGESTIONS



Removing Old Coating

To facilitate removal of old coating material from pipe to be cleaned and reconditioned at a central pipe yard at Edna, Tex., each pipe joint is heated as it is rolled to the cleaning plant. Heating is done by means of an improved circular gas burner which is pushed back and forth through the pipe.

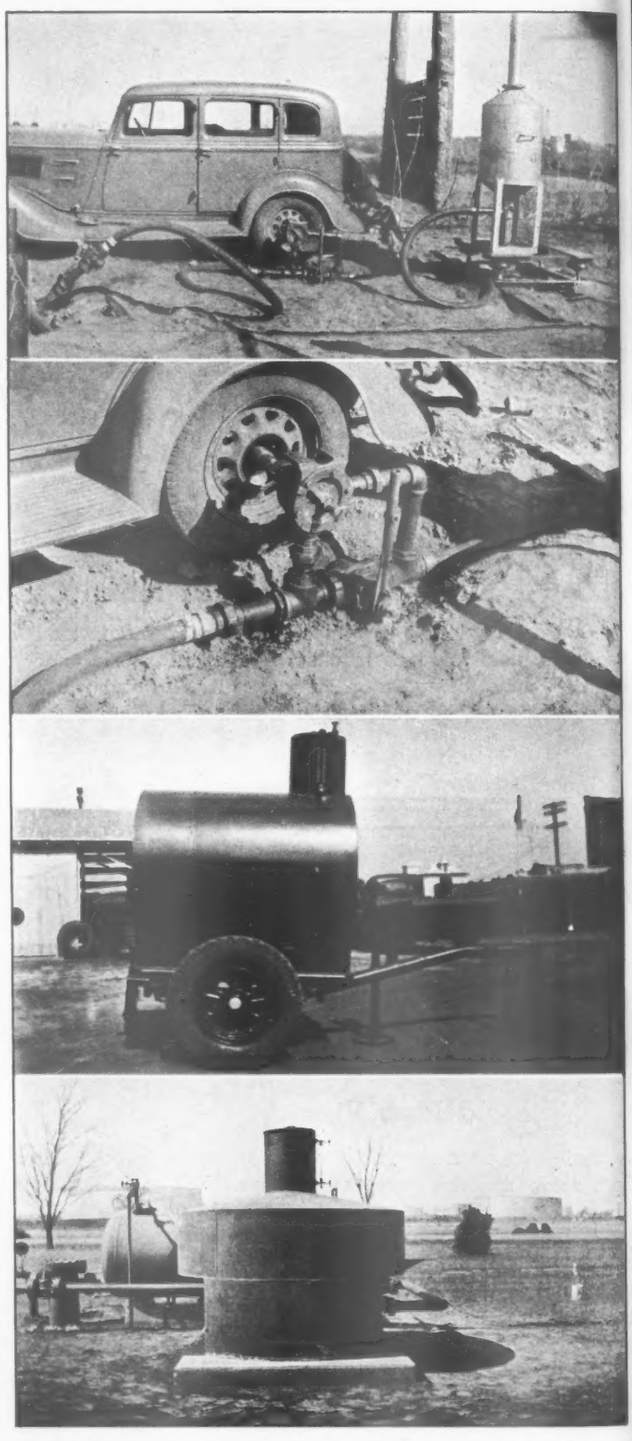


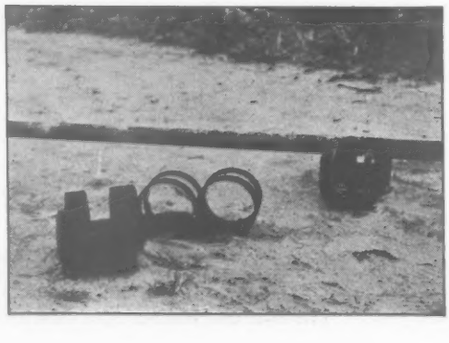
Foot Scraper and Rail

To keep dirt from being tracked into the station in muddy weather, it was found that this could be accomplished most effectively by placing a foot scraper near the entrance with a hand rail above it made of 1-inch pipe which would give a man something to hang on to while he did a thorough job of getting the mud off his shoes.

Calibrated Tanks for Meters

It is essential to check the adjustment of displacement meters from time to time. The frequency with which such checks are made is dependent upon a number of factors including the duty imposed upon the equipment and the characteristics of the commodity being metered. Some installations require a monthly check while others operating under less severe conditions require no attention for several years. Three tanks built for this purpose and shown in the accompanying pictures are the same in that they all consist of a calibrated neck, shell, and sump. One tank is permanent and forms an integral part of the meter installation; another is portable and may be moved from one meter setting to another with a pick-up or gauger's car; the third can be completely dismantled and carried in the rear of a car. Each tank has its own advantages and is adapted to a particular type of service. The tank sumps are fitted with two collars. The lower and larger serves as the inlet and outlet for the oil while the smaller three-fourths inch collar provides a convenient zero height bleed-off. The tank is calibrated from the bottom of the bleed-off collar to a point in the calibrated neck. When an installation is in the vicinity of a station the test tank flows into the station sump or suction line. When it is located at some distance from the station the oil is pumped back through the meter into the line by means of a small rotary pump in a by-pass.





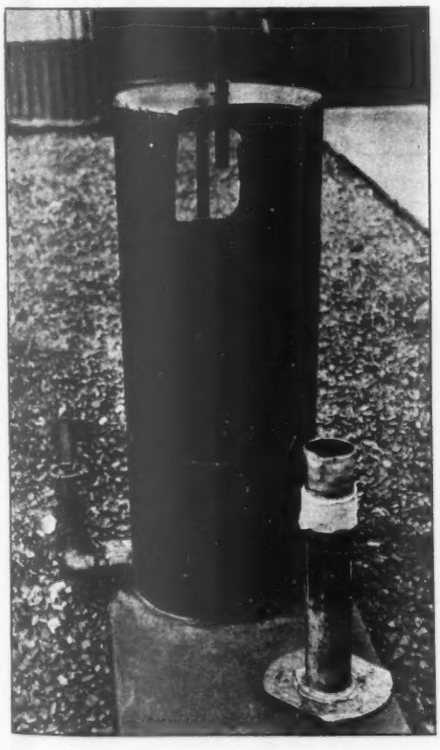
Welding Dolly

A gas company in Kansas uses this dolly to simplify the laying of small lines; it is easily made from scrap 6-inch line pipe. Dollies of this kind are compact and occupy less space than skids ordinarily used for this purpose. Lining up is done by tapping one way or another with a hammer; tacking can be done without interference; it is possible to bell hole the joint if desired. The line may be welded in sections or stormed. A dozen dollies are ample for laying light lines.

Lighting Manifold House

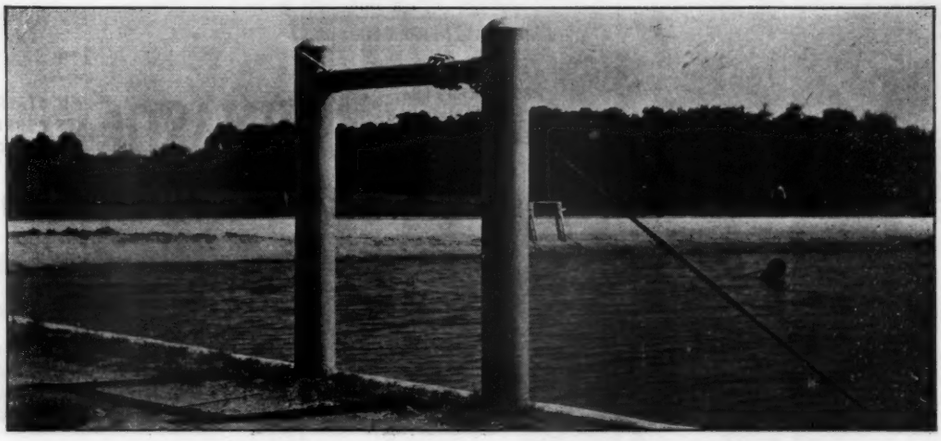
As a safety feature, a major pipe line company has installed a flood light outside which illuminates the interior of the manifold house through a window over the door. This eliminates the necessity of carrying a flashlight inside.

PRACTICAL SUGGESTIONS



Sample Catcher

This sample catcher, located at a pipe line station, was made from a length of 12-inch casing, welded across one end and cut out as shown, to prevent spilling oil.



Swing Pipe Winch at Water Cooling Pond

For adjusting a swing pipe in a cooling pond at a pipe line station, equipment is used consisting of two posts, at the top of which two short nipples are welded to serve as gudgeons, within which a nipple fits, extending between the two posts; to this nipple the end of the chain is fastened; by turning it the chain may be wound or unwound.

Cleaning Vat Equipped With Crane

A vat for cleaning fittings is equipped with burners for heating; a crane installed in connection with it is built to handle heavy fittings. The company has found that the use of a power brush in the cleaning operation gives very satisfactory results.

Danger Signal Near Work on Machinery

When work is being done on an engine, a large pipe line company makes a practice of placing a movable sign near where this is going on as a warning to those passing by.

NO OTHER PIPE COATING MATERIAL HAS BEEN IN USE AS LONG AS
BITUMASTIC
NO OTHER EQUALS ITS PERFORMANCE RECORD
THERE IS NO SUBSTITUTE FOR EXPERIENCE

MACHINE COATING—APPLIED BY THE COATING MANUFACTURER—ON-THE-JOB, REALLY PROTECTS NEW OR RECONDITIONED GAS OR OIL PIPE LINES.

Proper application of pipe coating material is essential if the most lasting protection is to be assured. No one can know as well as we do how best to apply Bitumastic—or can anyone else be expected to take as much pains to turn out a perfect pipe coating job. We guard our reputation carefully as our success depends so much on customer satisfaction.

For these reasons we have developed our economical on-the-job, machine-coating method of applying our Bitumastic pipe covering materials with or without a wrapper. We set up our newly-developed, semi-portable, end-feed coating machine in a temporary coating yard or "shop" near the right-of-way. Our own men do the work—including supervising the coating of field joints. There is no delaying of the contractor. Coated pipe is delivered to the right-of-way without damage.

You get the most permanent protection it is possible to get for your pipe lines, for no method of pipe coating has yet been devised which insures such perfect, permanent results as the combination of Bitumastic coating materials and Bitumastic on-the-job machine coating.

We will be glad to tell you whether our method is practical for any pipe line work you have in prospect and quote prices, if you will let us know total footage, diameter of pipe, type of coating required, location of job, etc.

Features of This New On-the-Job Machine-Coating

Coating yards set up near right-of-way.

Coating applied by pipe coating manufacturer.

Pipe coated well in advance of laying needs.

A reservoir of coated pipe is customary.

Therefore, contractor suffers no delay.

No coating of wet or dirty pipe; minimum weather delays.

No waste of coating material; even thickness; no drips, runs or festoons.

Only one run through machine for coating and wrapping.

Holiday detected.

Coating of field joints supervised.

•

GENUINE BITUMASTIC PRODUCTS ARE USED

•

Also MANUFACTURERS OF INDUSTRIAL PAINTS for All Exterior and Interior Plant surfaces

WAILES DOVE-HERMISTON CORPORATION

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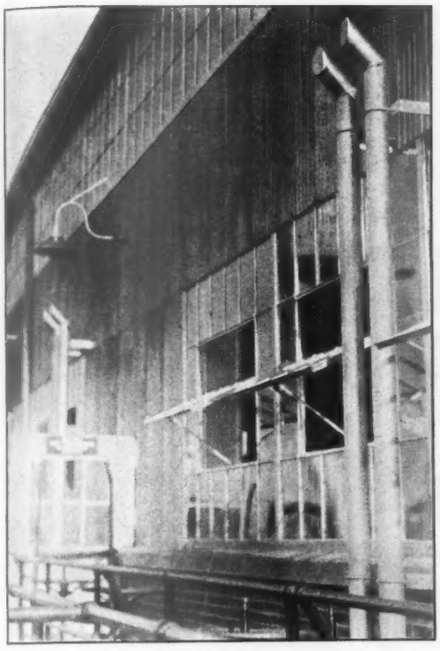
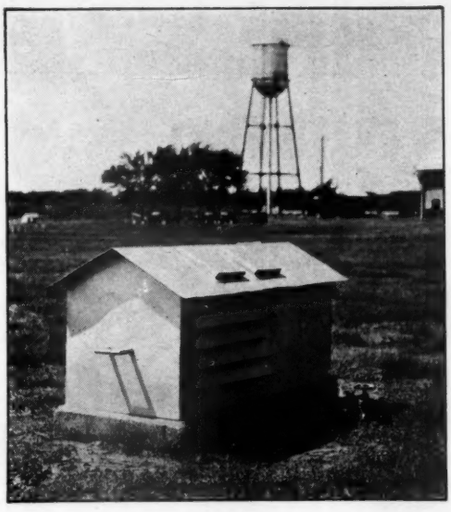
PRACTICAL SUGGESTIONS

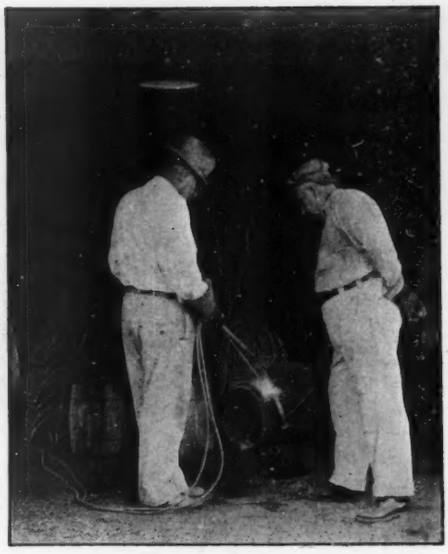


Pop Valves Protected

At a trunk line station on a gas line, thin lead plates are installed over the openings of pop valve risers which are readily blown off when the valves pop. These coverings keep out rain and dirt. Another line used coverings of gasket material.

House for Centrifugal Pump



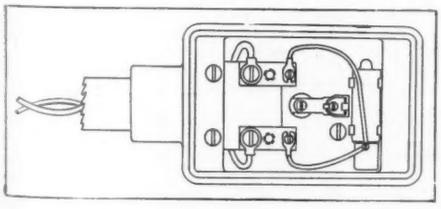


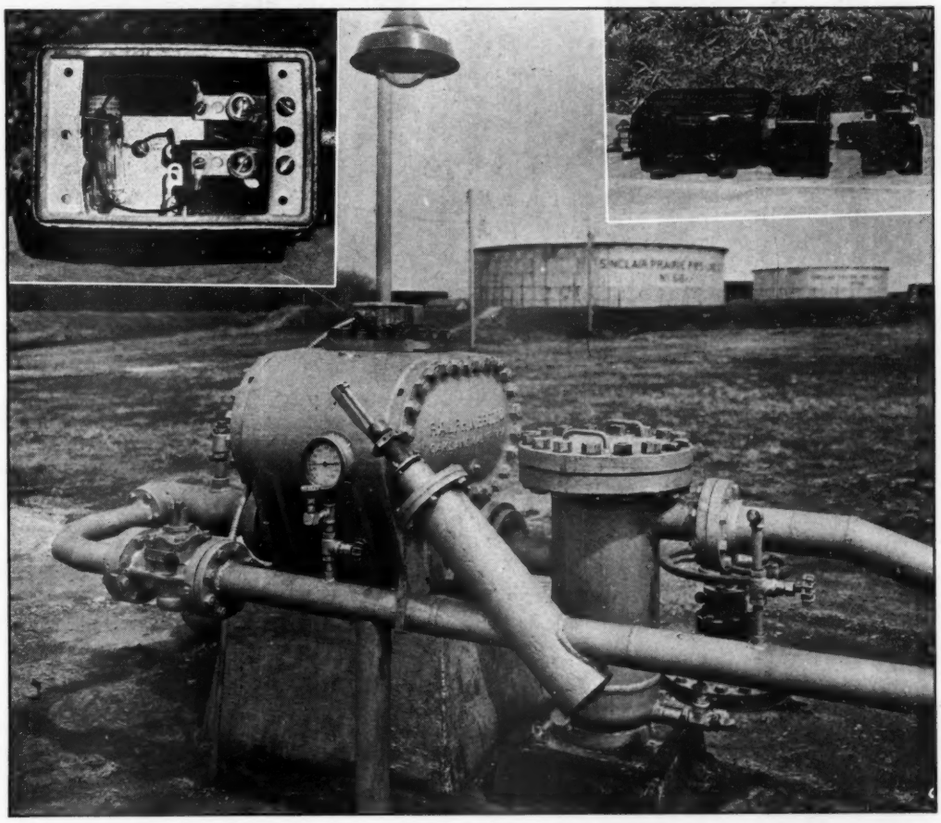
Leak Clamps From Old Pipe

A pipe line company makes all its leak clamps from sections of old pipe. The pipe is cut with a torch to the desired sizes at the company's machine shop and warehouse near Houston, Tex. In repair of leaks on a line, a rubber plug is placed over the leak. Then with the clamp to hold the rubber plug in position, coating material is poured over and around the repair, and the clamp.

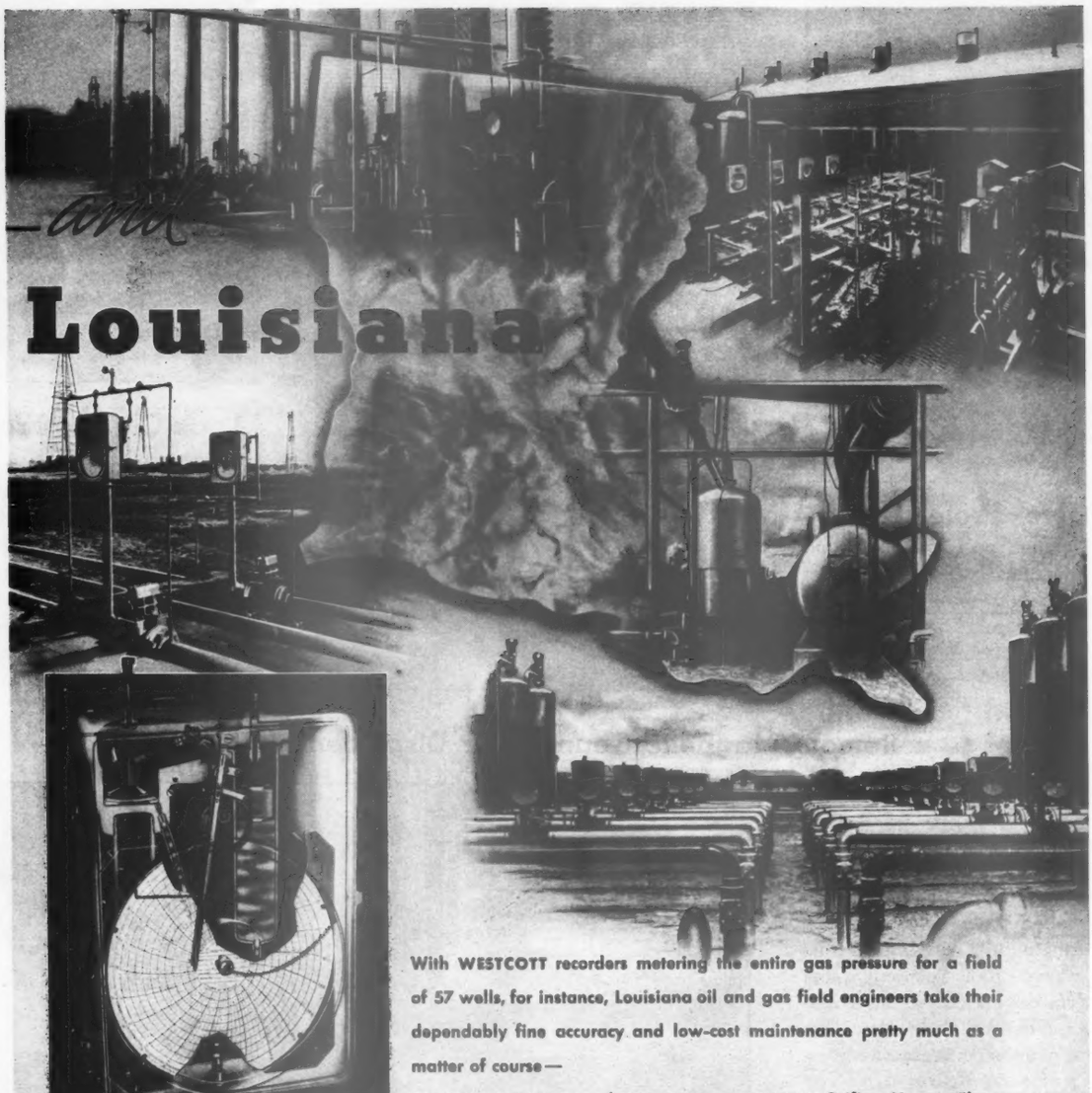
Remote Magnetic Counter for Displacement Meter

When displacement meters are located at some distance from a pipe line station, it is often advantageous to install a remote magnetic counter in the office of the station engineer. Pictures and drawings of such an installation developed by the telephone and telegraph department of a major pipe line are shown. A vapor proof electrical outlet box is added as an appendage to the standard counter mechanism on the meter. The shaft of the meter counter, making one revolution per barrel, is extended into the outlet box by means of a small extension shaft. A short arm attached to this shaft supports a magnet which in turn revolves in the vicinity of a small mercury switch. The mercury switch is in a circuit with a magnetic counter and each time it is actuated by the magnet it provides an impulse for the magnetic counter and 1 barrel is recorded. For an installation of a local nature, a simple circuit consisting of a mercury switch and a magnetic counter can be used.





When it is desired to transmit impulses a greater distance, parallel telephone circuits can be used by "simplexing" or carrier frequency waves utilized in a telegraph circuit. This idea may find application where it is desirable to provide a field station with a barrel-by-barrel report of its deliveries to some distant point. It is also possible to provide a dispatcher with a series of remote counters representing meters located at each station on a particular line or system eliminating the necessity for hourly stock reports. A dispatcher provided with remote counters has a means of making an immediate check upon rates of flow or line conditions between all points.



With WESTCOTT recorders metering the entire gas pressure for a field of 57 wells, for instance, Louisiana oil and gas field engineers take their dependably fine accuracy and low-cost maintenance pretty much as a matter of course—

METRIC-AMERICAN and WESTCOTT-AMERICAN Orifice Meters, Flowmeters and Control instruments are found throughout Louisiana's production, pipeline and refinery operations . . . meeting every condition of pressure, flow, kind and size of piping, specific gravity, viscosity, temperature . . .

Integrating, Recording and Indicating types of Orifice Meters and Flowmeters . . . for the modern metering of oil, gas, steam, air and liquids . . . are described fully in Bulletins EG-2 and E-3. (Also write for complete specifications on the New METRIC Air-Actuated Remote Recorder and Controller.)

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AMERICAN METER CO. INC.

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1044

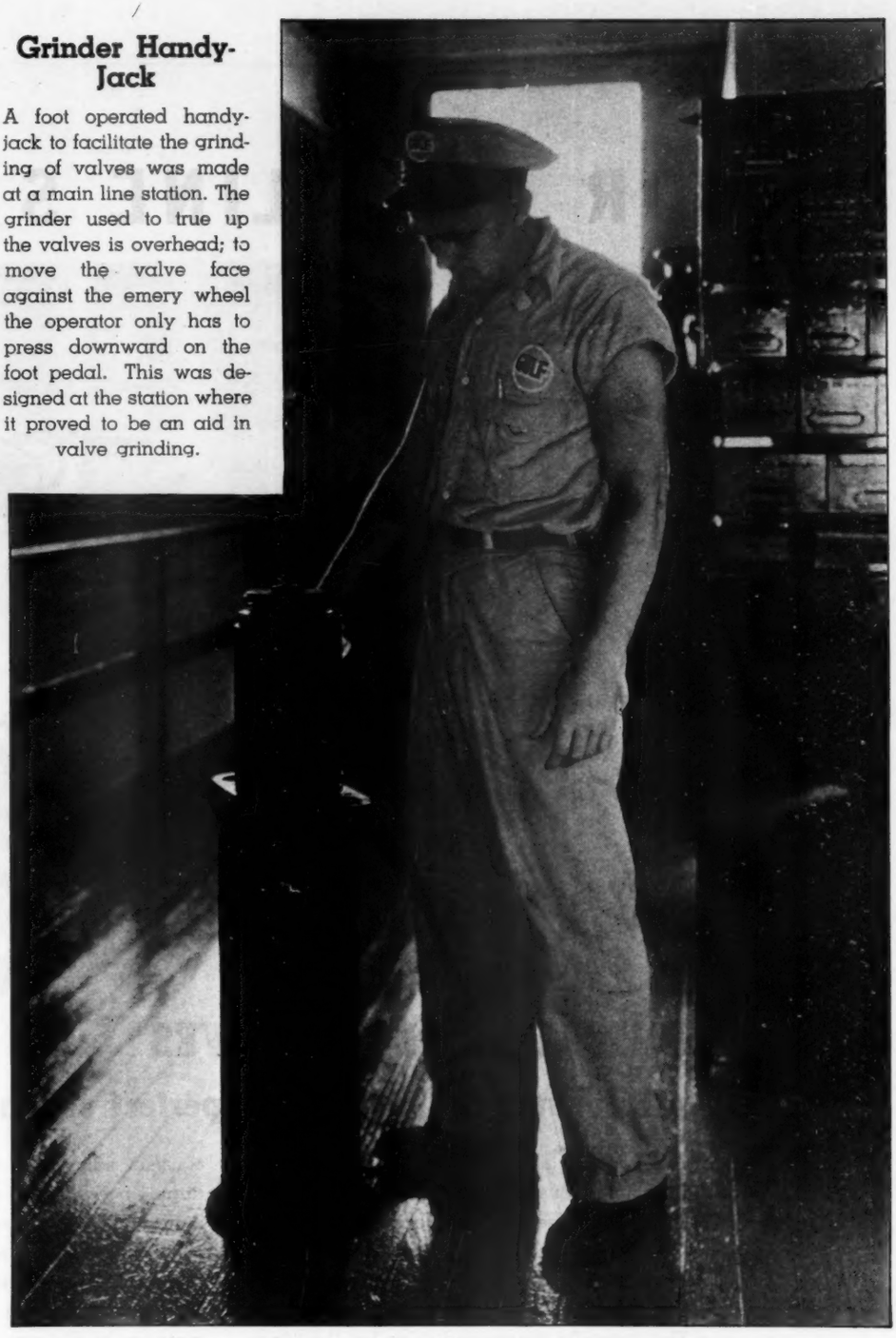
PRACTICAL SUGGESTIONS

Power-Driven Pipe Dies

Time and labor may be saved by using a power drive on the larger pipe dies. A major company has installed such equipment on trucks and pick-ups. In making one of these, two universal joints are obtained from an automobile junk yard; they should be of a kind that fit a 1-inch square shaft. Those to be had from Model-T Fords are good for this purpose. These joints are welded to the ends of a shaft made from seven-eighths inch sucker-rod. When used with a truck, a socket is made which is welded to the center of a piece of steel, 6 inches in diameter, which is brazed to the end of the left winch cathead. For a pick-up, a 3-inch pipe collar is capped; a socket is welded to the center of the cap; the collar slips over the car axle. Three arms cut from light steel, such as tank stave, are welded and braced to the other end of the collar; they extend to three lug bolts. This fitting may be left on the pick-up when not in use; the drive is installed on the left wheel so that the operator may easily watch operations. The wheel is jacked up; the clutch is put in low and the engine is run slowly.

Grinder Handy-Jack

A foot operated handy-jack to facilitate the grinding of valves was made at a main line station. The grinder used to true up the valves is overhead; to move the valve face against the emery wheel the operator only has to press downward on the foot pedal. This was designed at the station where it proved to be an aid in valve grinding.

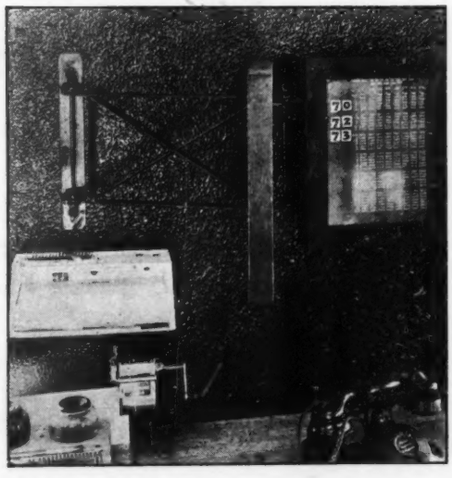


Sleeve for Repairing Line

A division superintendent for a gas trunk line had a two-piece split sleeve made for use in repairing 24-inch pipe; space is provided for the pipe weld under the steel strap around the sleeve.

Tank Table Swing

At the operator's desk, a swinging, hinged device holds tank tables so that they may be pulled up for close examination when wanted and pushed back out of the way against the wall when not in use. As can be seen, the tank tables are covered with glass and framed. It is possible to turn the tables like the leaves of a book.



FOR PIPE LINE SERVICE

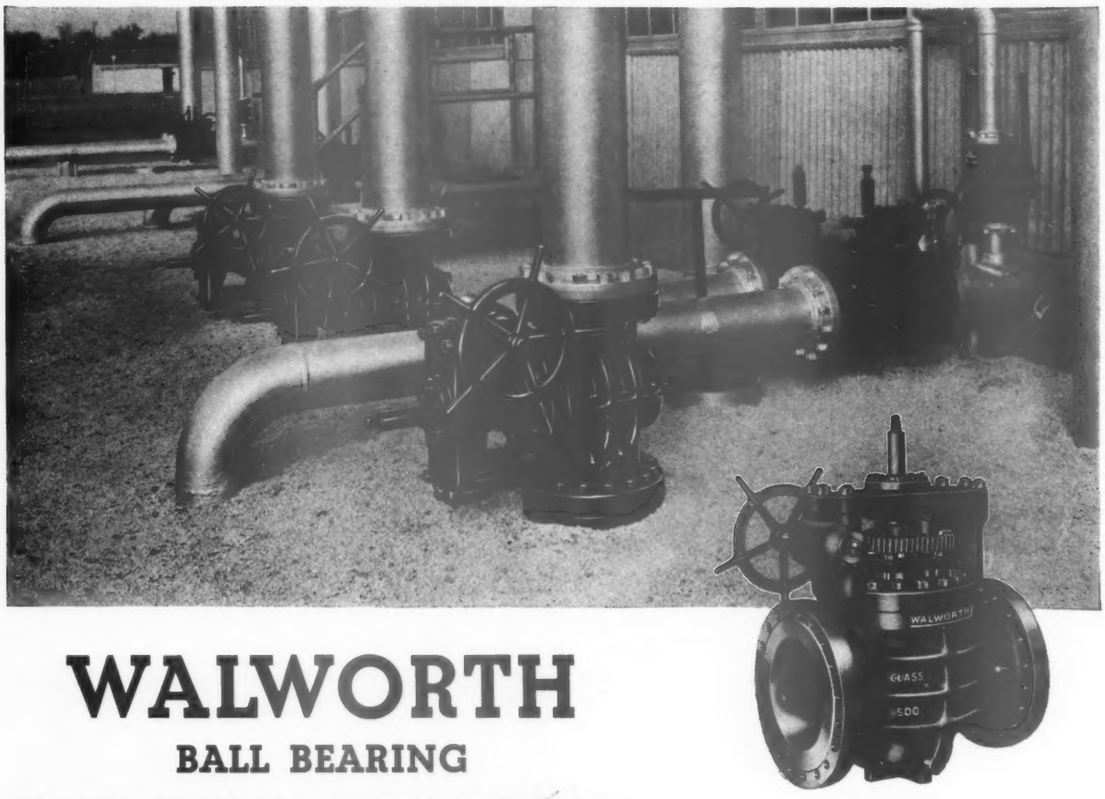


Figure 1623F

WALWORTH

BALL BEARING

LUBRICATED PLUG VALVES

assure constant adjustment . . . perfect seating . . . easy turning

Designed for oil or gas pipe line service at pressures up to 500 pounds per square inch, the Walworth Figure 1623F Class 500, Steeliron, Ball Bearing, Venturi Pattern, Worm-gear Operated Lubricated Plug Valve incorporates many features of engineering significance, and assures dependable, economical service. » » » This ruggedly constructed valve has the advantage of streamlined ports and a simple but perfect lubricating system. The upward thrust of the plug is accurately controlled by the ball bearings, assuring constant adjustment with perfect seating and easy turning. » » » The Walworth Lubricated Plug Valve Figure 1623F has proved its ability to give a dead-tight shut-off where leaks are hazardous or costly, on substances difficult to hold. » » » The new Walworth Catalog 89 gives full particulars regarding the complete line of Walworth Valves, Fittings, Pipe and Pipe Wrenches, as well as 100 pages of engineering data, including Flow Charts, etc. Write for your copy on your business stationery.

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VALVES
FITTINGS
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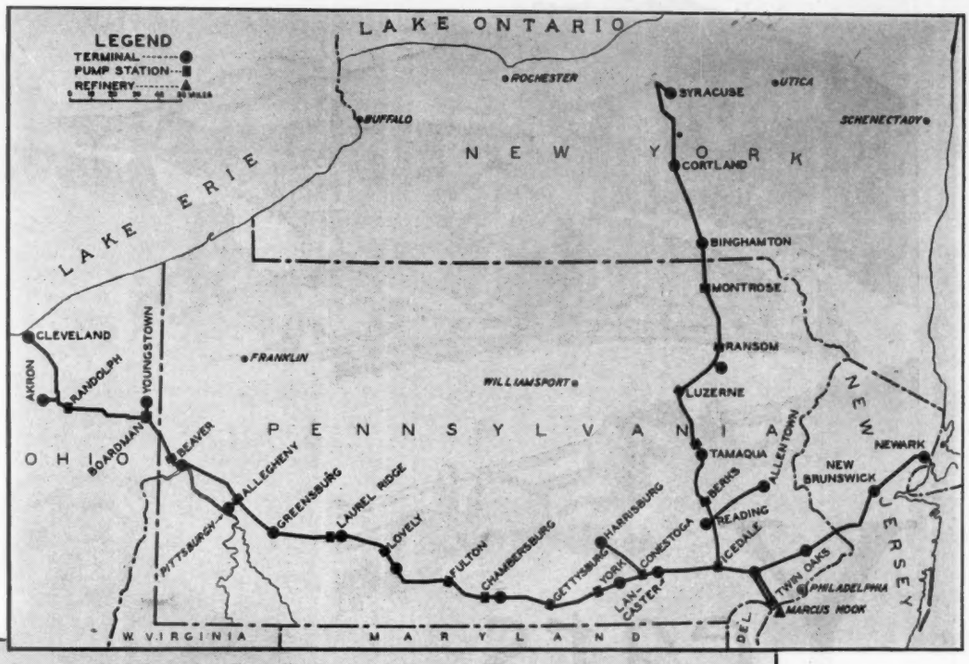
Backed by
96 Years' Service

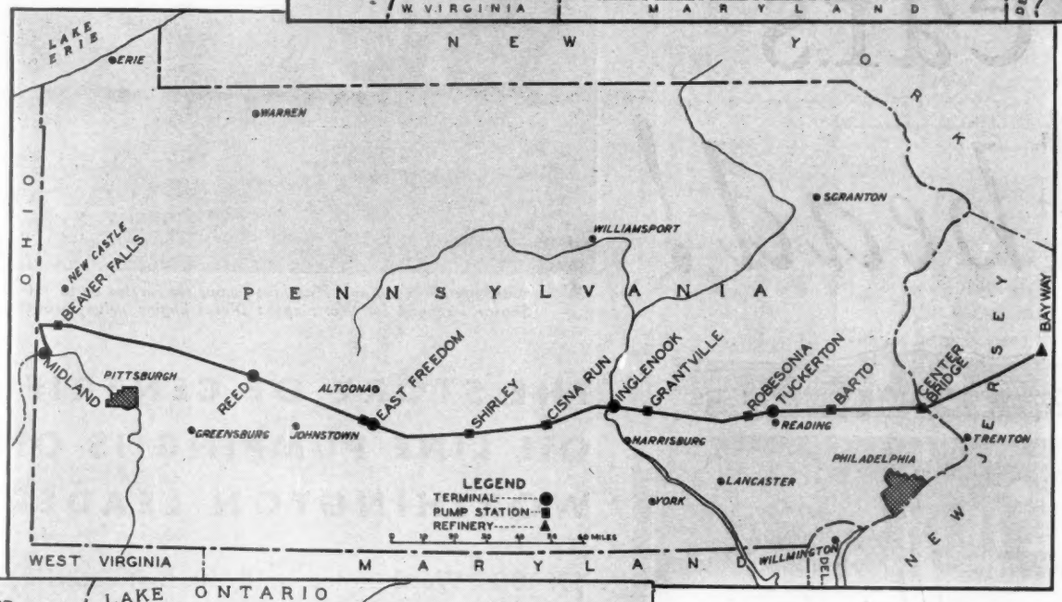
DISTRIBUTORS IN PRINCIPAL
CITIES THROUGHOUT THE WORLD

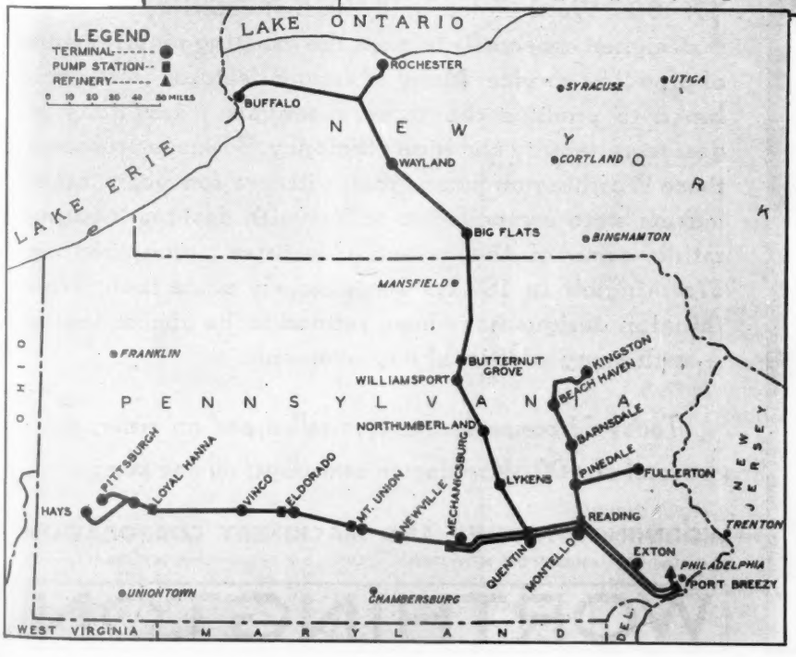
SUSQUEHANNA

(Upper)

The Susquehanna Pipe Line Co., together with the Sun Oil Line Co. and Sun Pipe Line, Inc., all subsidiaries of the Sun Pipe Line Co., provide approximately 800 miles of gasoline lines reaching from the company's plant at Marcus Hook to Cleveland and Syracuse







TUSCARORA

(Middle)

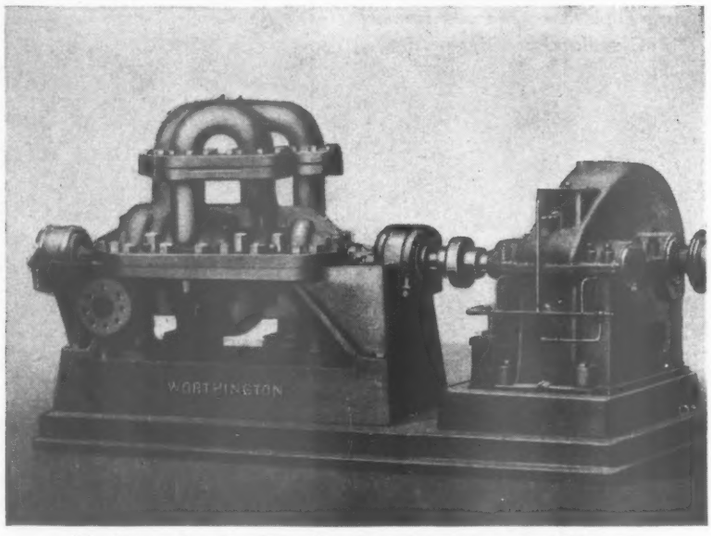
The Tuscarora Oil Co., Ltd., a subsidiary of the Standard Oil Co. of New Jersey, operates 597 miles of 6- and 8-inch gasoline pipe lines leading from the parent company's refineries at Elizabeth, Bayway, and Linden, N. J., to marketing points throughout southern Pennsylvania and terminating at Midland, near Pittsburgh

KEYSTONE

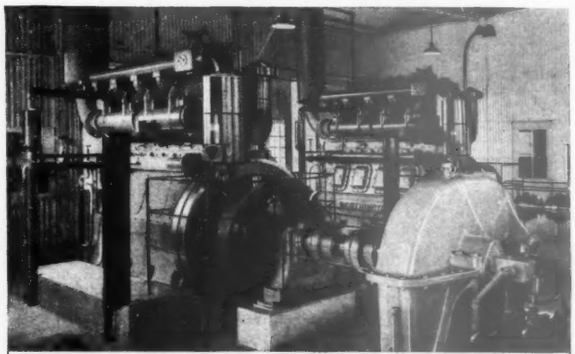
(Lower)

The Keystone Pipe Line Co., a subsidiary of the Atlantic Refining Co. and operating in Pennsylvania together with the Buffalo Pipe Line Co., also an Atlantic subsidiary but operating in New York, provide more than 700 miles of pipe lines for the distribution of gasoline from the Philadelphia plant

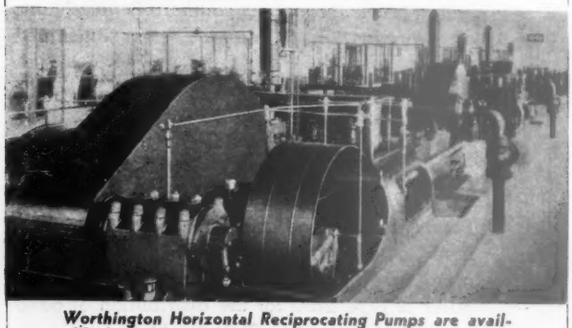
Years Ahead!



Worthington Centrifugal Pipe Line Pump, for service up to 1200 p. s. i. Shown arranged for Worthington Diesel Engine drive through gears



Worthington Diesel Engines, Gas Engines or Convertible Gas-Diesel Engines, for pipe line and all other petroleum industry applications



Worthington Horizontal Reciprocating Pumps are available for field, pipe line and refinery applications . . . for all conditions of service

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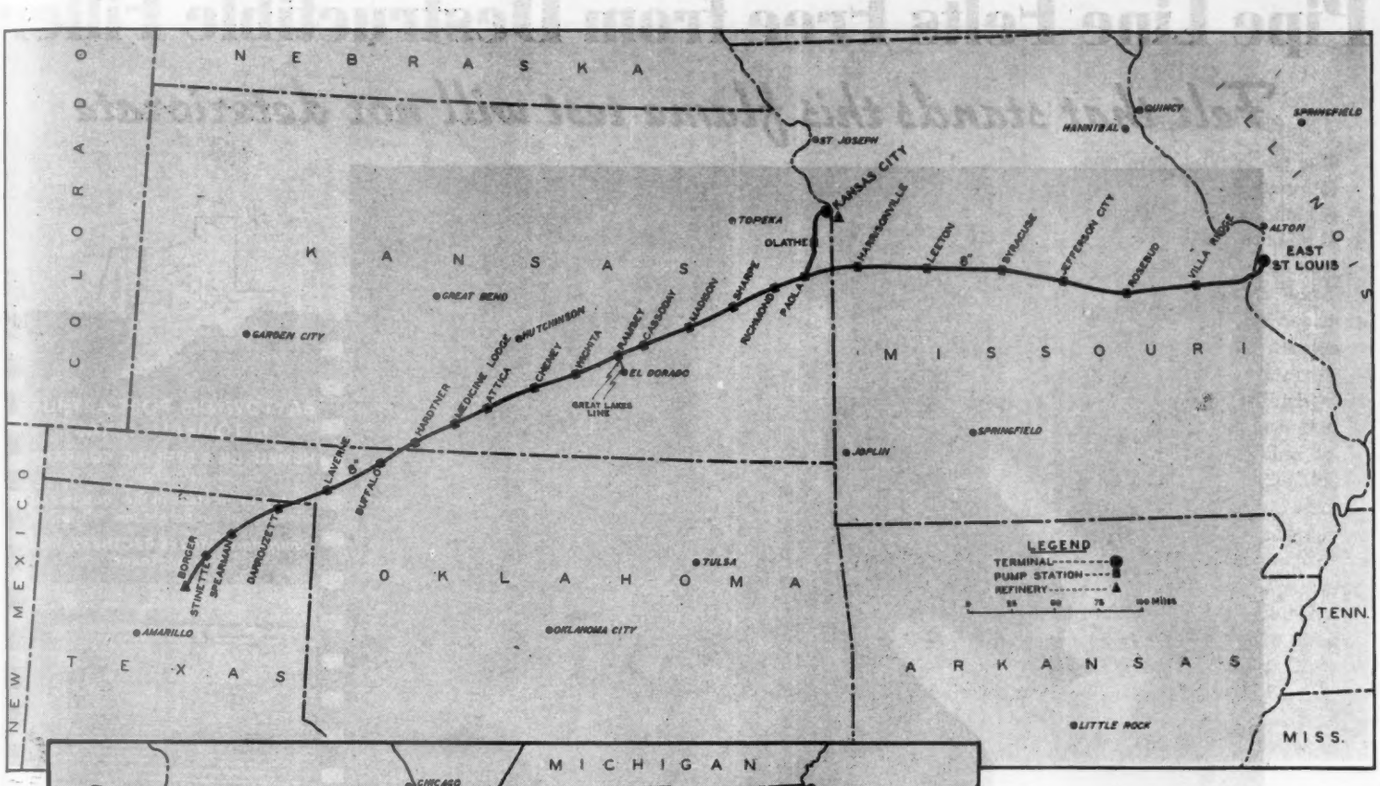
IN 1927 Worthington built the first centrifugal pumps designed *especially* to meet the exacting requirements of pipe line service. Many advanced features were combined to produce the three essentials . . . simplicity of design, reliability and high efficiency. So successful were these Worthington pumps that, within a few years, other makers were compelled to follow with designs incorporating some of the essential features . . . pioneered by Worthington in 1927. Continuously since then, Worthington designs have been refined to the utmost degree . . . with many additional improvements.

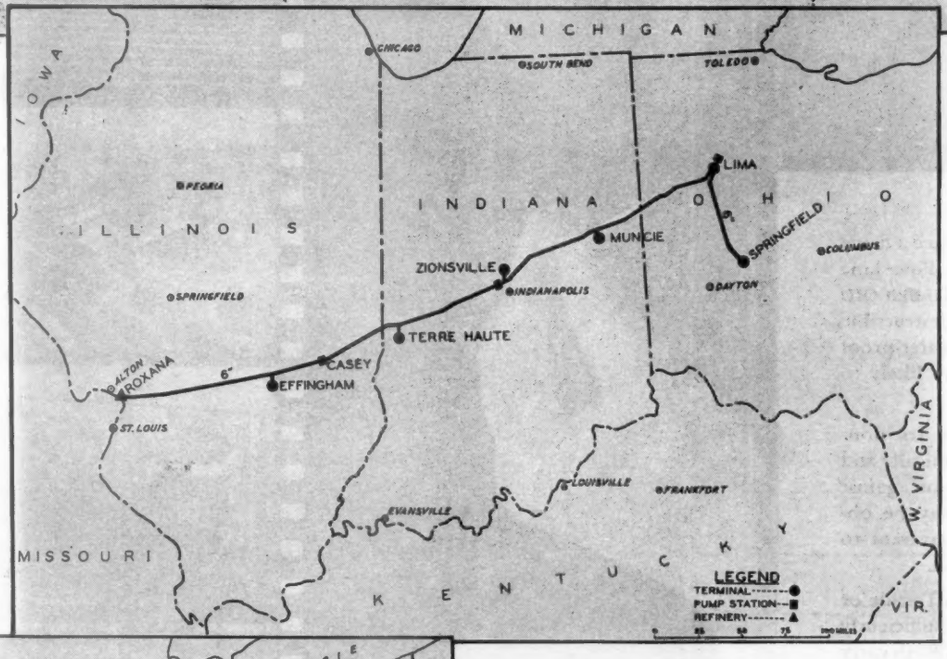
Today 31 companies have, installed and on order, a total of 400 Worthington centrifugal oil line pumps.

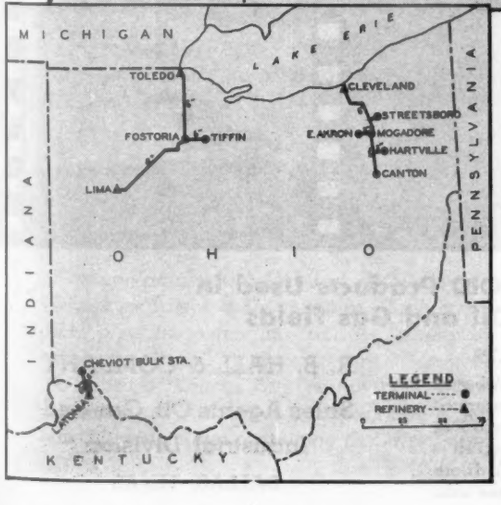
WORTHINGTON PUMP AND MACHINERY CORPORATION

General Offices: HARRISON, NEW JERSEY - Offices and Representatives in Principal Cities

WORTHINGTON







PHILLIPS SYSTEM
(Upper)

The 736 miles of pipe line extending from the Phillips Petroleum Co. refinery at Borger, Tex., to East St. Louis and operating as the Phillips Pipe Line Co. may claim to be a pioneer in gasoline pipe line transportation in many respects. This line handles several grades of refinery gasoline, natural gasoline and butane simultaneously and its pumping stations operate on butane.

SHELL PIPE LINE SYSTEM
(Middle)

The Shell Pipe Line Co., newest of the major gasoline pipe line systems, originally planned to lay a line from the Shell refinery at Roxana, Ill., to Indianapolis, Ind., but these facilities have since been extended to Lima and Springfield, Ohio. Arrangements have been made for the delivery of Shell gasoline to the Standard of Ohio system at Lima for delivery to the Shell terminal at Toledo

STANDARD OIL CO. (OHIO)

Standard Oil Co. of Ohio has built three separate gasoline pipe line systems, the one serving its refinery at Latonia, Kentucky, another connecting the Lima refinery with Toledo and the other extends from the Cleveland refinery south to serve markets in Akron and Canton

Pipe Line Felts Free from Destructible Filler

Felt that stands this flame test will not deteriorate

TEXAS
BAYTOWN to PORT ARTHUR
to TOMBALL, TEXAS
HUMBLE OIL & REFINING COMPANY
INC. LINE
Photographic steps in the coating and winding of underground oil pipes
Contractors: MAYES BROTHERS, INC.
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WE INVITE YOU to make this test. Place a flame under a piece of RU-BER-OID Asbestos Pipe Line Felt. Only the saturant will burn, for RU-BER-OID Felt is 99% Pure Asbestos—free from destructible filler. This means positive, not partial water-proof pipe protection, for fillers that burn are likely to deteriorate underground.

RU-BER-OID Asbestos Pipe Line Felts are non-capillary and non-tubular. They are chemically and electrically inert, affording added protection against electrolysis and stray currents. They may be obtained with either coal tar or asphalt saturant to meet the type of primer and enamel used.

Regardless of which type you select, no Tensile or Mullen strength is sacrificed. Both are sufficiently rugged to stand hand or mill wrapping. Both carry the maximum percentage of saturation, and like all products made by The Ruberoid Co., quality is kept uniform by rigid laboratory control.

Be sure to use RU-BER-OID's 99% Pure Asbestos Felts. They cost no more but give you added protection. Samples and our valuable instruction booklet will be forwarded free. Address Pipe Line Engineering Dept., The Ruberoid Co., 500 Fifth Avenue, New York, N.Y.

RU-BER-OID PIPE LINE FELTS

RU-BER-OID Products Used in the Oil and Gas Fields

RU-BER-OID PIPE LINE FELTS

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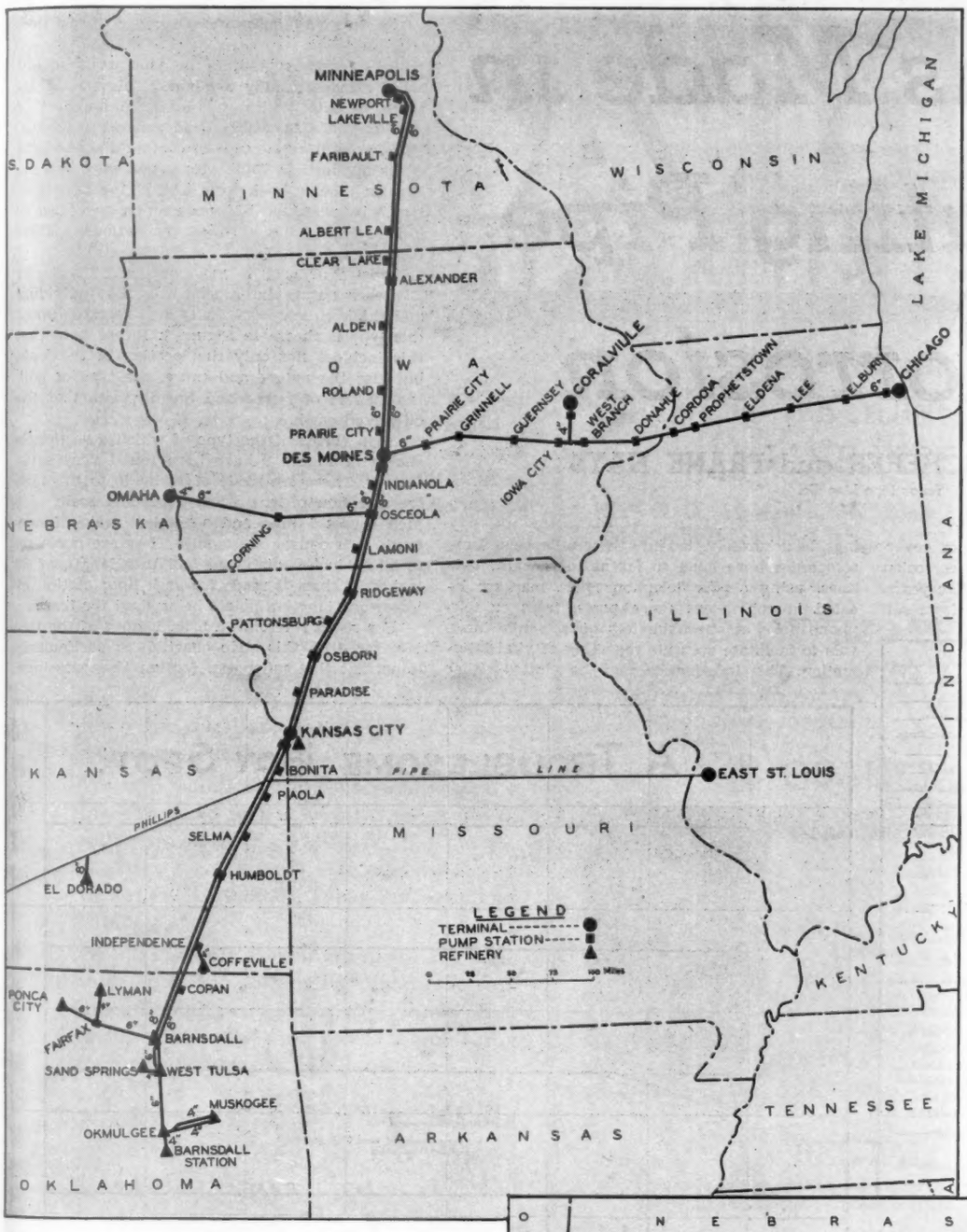
R. B. HALL & COMPANY
Sales Agents Oil, Gas and Industrial Division
DALLAS, TEXAS



GREAT LAKES

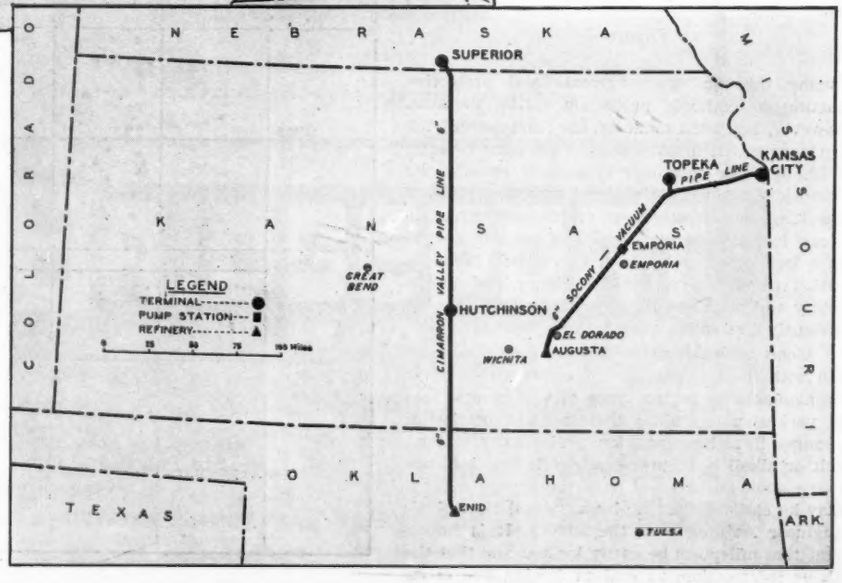
The Great Lakes Pipe Line Co., owner and operator of 2,081 miles of lines, the largest gasoline system in the world, connects nine large refineries in northern Oklahoma to terminals located at Kansas City, Omaha, Des Moines, Minneapolis and Chicago. Refining companies participating in the line include Continental Oil Co., Barnsdall Oil Corp., Mid-Continent Petroleum Corp., Skelly Oil Co., Pure Oil Co., Phillips Petroleum Co., Sinclair Refining Co., Texas Co., and Cities Service Oil Co.

CIMARRON VALLEY

Cimarron Valley Pipe Line Co., a subsidiary of the Champlin Refining Co., operates a 6-inch gasoline pipe line originating at the Champlin refinery at Enid, Okla., and terminating at Superior, Neb. No other refineries are connected to this line

WHITE EAGLE

Socony-Vacuum Oil Co., Inc. (White Eagle Division) operates 177 miles of 6-inch gasoline pipe line extending from its refinery at Augusta, Kans., to Kansas City. Terminal facilities at Kansas City permit loading the gasoline on barges for transportation down the Missouri River and along the Mississippi



Records Made in Combating Pipe Line Corrosion

By LEWIS F. SCHERER and FRANK HAYS
Texas Pipe Line Co.

Much technical literature covering various phases of the pipe line corrosion problem has appeared during the past five years. The subjects have covered everything from soil testing through stray currents and protective coating to cathodic protection. Little mention, however, has been made of the fundamental importance of the maintenance of adequate records. Without some thorough system of records the corrosion engineer is without means of readily checking the effectiveness of his protective devices. Needless to say, a lack of records results in a lack of control, which may result in duplication of effort, waste, inefficiency and uncertainty and may lead the management to question seriously the entire program.

A comprehensive system of records should begin with the original survey. Information should be available as to the types of soil encountered at various points along the line, the location of changes in soil composition, gulleys, dry washes, salt or alkali beds, marshes, etc. If this information cannot be obtained from the survey notes it may be easily picked up by a trained electrolysis engineer walking over the survey. It is important that mileposts be easily located and that the above information, as well as foreign line crossings, be accurately tied into these mileposts. Some companies have gone so far as to rechain their lines, using copper telephone pole markers located in convenient fence posts, trees or telephone poles at approximately quarter-mile intervals to facilitate accurate reporting of vital information. This information may be plotted either on existing alignment maps or on a "Leak Record Chart."

Information regarding the pipe itself should also be made readily available. This should include the date the line was laid, manufacturer of the pipe, its size, weight, and general characteristics, as well as the type of coating and the date of its application. This information may best be kept in tabular book form as a "Pipe Line History," listed either by construction sections, or if it is to be made up new, by station-to-station sections.

It is of primary importance that all leaks of whatever nature be reported to the individual maintaining the records. A typical report form of this type is shown in Figure 1. Please note that this includes not only the location of the leak, but also the nature and cause, the type of soil, the method of repair and the disposition of the oil-soaked earth.

Strip charts of the type of which a section is shown in Figure 2 have been found very satisfactory. These are made of 10 by 10 to the inch cross section paper with a horizontal scale of 1 inch equals 1 mile and a vertical scale of one-tenth inch equals one month. They are made up to be 11 inches high and fold to a length of 36 inches. A chart is made for each line; station or important junction points being used for termini.

For ready reference a brief history of the line is entered on this strip chart. It is particularly important that mileposts, foreign line crossings,

OIL LOSS REPORT

REPORT NO. 87-180

Dist. No. 12 Main Line Station "A" - Station "B"

Division P. L. Co.

Date of Break July 23rd 1936, Hour 9 A.M. of Line Size 8" Unit or Line No. 3

3 Miles East · from "A" Station, County Harris State Texas

Land Owner (E. H. S. W.) H. A. Smith Tenant's Name Owner

Gathering or Trunk Line Trunk Section Township Range

Distance from Mile Post or other known point 85 Ft. E. ☒ of 150 plus 40

Station Pressure 750 Pounds, Dropped to No drop Pounds, Oil Temperature Not shut down.

Shut Down at M. Date , Resumed pumping at M.

Reported by A. M. Jones Address Houston at 9 A.M.

Nature & Cause of Break (Collar-Corrosion-Weld or Pipe Failure)

Pintole in bottom of pipe. Corroded area about size of silver dollar.

Nature of Soil--Wet or Dry--Salt Water-Sulphur-Alkali-Acid-Sewage Wet Clay.

Depth line buried 2'

Estimated Gross Loss 25 Bbls. Estimated Recovery None Bbls. Net Loss 25 Bbls.

Disposition of Oil Lost Burned and drifted off on small creek.

Repaired by A. M. Jones and 5 men. Date July 23rd, at 4 P.M.

How Repaired and Material used Pipe Clamp

Estimated Cost of Repairs $ 25.00

Disposition of oil soaked earth Removed Was fresh dirt used in filling in? Yes. Was hole left open? No. Was Pipe Redeped? No.

Estimates of Property Damage: Timber $, Land $, Pasture $, Other Crops $, Stock Water $, Live Stock $, Property $

Total Damage $

REMARKS: Pipe in bad shape here - three other clamps on same joint.

Date of Report July 24th 1936

Signed: District Foreman.

Figure 1

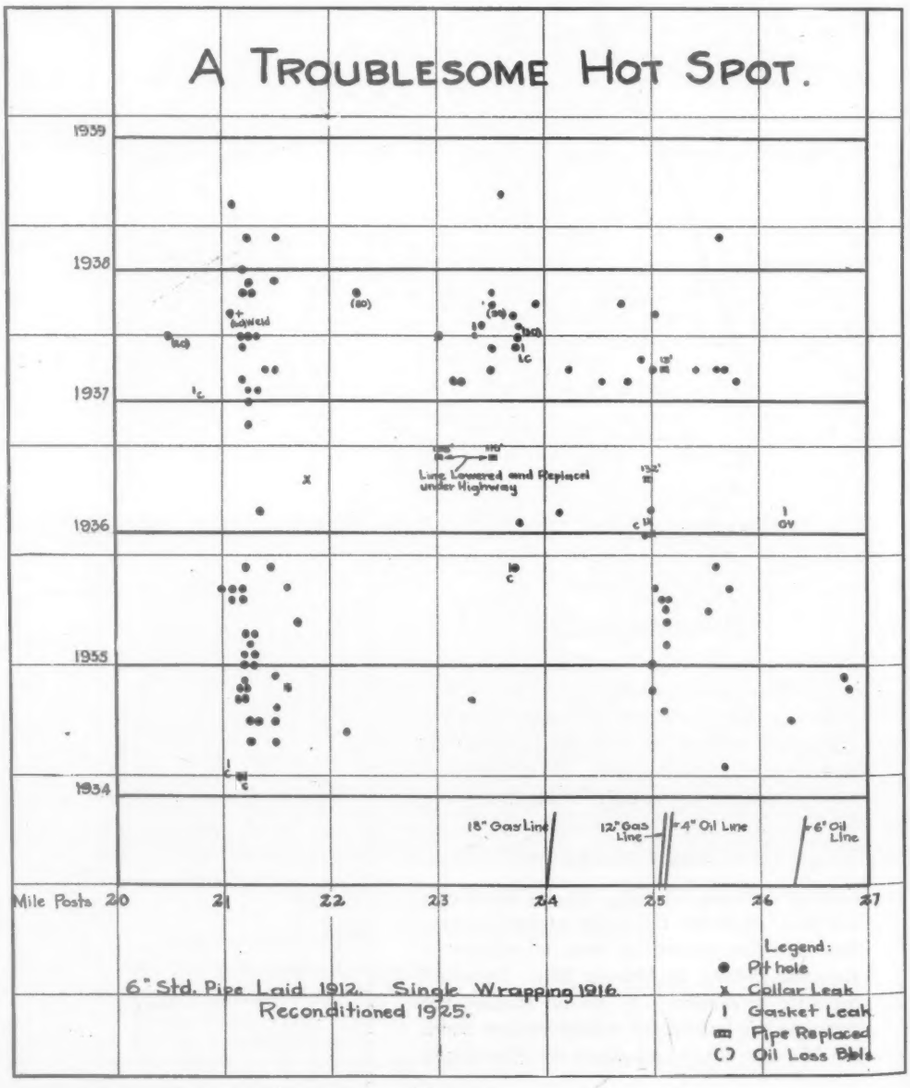


Figure 2

Big Savings for PIPE LINE USERS

Many major pipe line operators take advantage of the very substantial savings and the opportunity to lower investments by calling Bridgeport when circumstances and operating conditions justify the use of reconditioned or used Line Pipe.

Often good used Line Pipe serves the purpose adequately for lateral lines, oil gathering lines to producing wells, gas and water service lines, etc.,at considerable reduction in pipe line investment. When the use for the line is temporary, or of comparatively few years duration, dependable used pipe can be used at less cost.

We can practically always supply from a few thousand feet to several miles of the following sizes: 2", 3", 4", 5", 6", 7", and 8", from conveniently located yard stocks in Kansas, Oklahoma, Texas, Louisana and Illinois.

We also supply new Line Pipe of any size, in any quantity, for any locality direct from the mills; and carry reasonably large stocks, of the commonly used sizes, in our yards for quick delivery to field locations.

★ ★ ★ *WHEN YOU NEED NEW OR USED LINE PIPE telephone*

35,000 Feet of 4-INCH WROUGHT IRON LINE PIPE

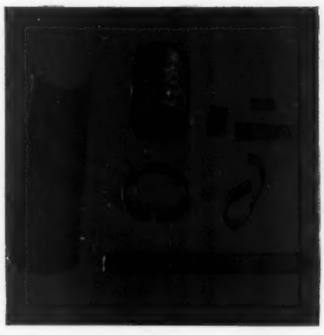
4½" O. D., 10-thread, 4⅝" long couplings, 20-22 foot joints, good threads.

In stock at Wichita, Kansas and Wichita Falls, Texas

DELIVERED PRICE

33c per foot, in lots of 5,000 feet or more, delivered within a radius of 500 miles of present stock locations.

QUALITY



Disinterested analytical and testing laboratory reports.

1—Material is genuine hand puddled wrought iron pipe.

2—Sample stood hydraulic mill test pressure of 1400-lbs. per sq. in., the standard for this size wrought iron pipe.

3—With slight variations, tensile strength in body and weld were the same as the normal for wrought iron pipe of this size.

4—Pipe can be expected to last for a good many years under average soil conditions. Genuine, hand puddled Wrought Iron Line Pipe has been known to last 50 years.

RENTAL

Proposals will be entertained for renting a mile or more of this pipe on Rental-Purchase contract.

All or any part offered subject to prior sale or rental and subject to price change without notice.

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THE BRIDGEPORT MACHINE COMPANY Factory and General Offices, Wichita, Kansas

HOUSTON
L. D. 203 Local "Cap" 1301

DALLAS
L. D. 584 Local 2-4282

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L. D. 219 Local "Gar" 5671

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L. D. 31 Local 574

ODESSA
L. D. 683 Local 684

FORT WORTH
Local and L. D. 3-3506

SHREVEPORT
L. D. 15 Local 6481

CENTRALIA, ILL.
Local and L. D. 589

TULSA
L. D. 681 Local 5-3204

OKLAHOMA CITY
L. D. 785 Local 7-2725

BARTLESVILLE
Local and L. D. 3410

WICHITA
L. D. 59 and 116
Local 2-1431 and 2-1432

AND BRANCH STORES

creeks, rivers, highway crossings and the location of cathodic units be clearly shown in their true relation.

The information furnished by the "Leak Records" is then plotted on these charts through the use of a set of suitable symbols. If at all obtainable, leak records of the past several years should be plotted as they will be found to be of considerable assistance.

A study of the chart in Figure 2 shows clearly what a wealth of information may be obtained from a rapid scanning of such charts. "Hot spots" show up readily so that remedial measures may be taken with reasonable promptness. The effectiveness of a cathodic unit is immediately and forcefully obvious without a time-consuming search of scattered records. It is possible to plan survey work and budgets far in advance and to route survey crews with the minimum of back tracking.

Cathodic unit installations should be assigned numbers and a perpetual history of each unit

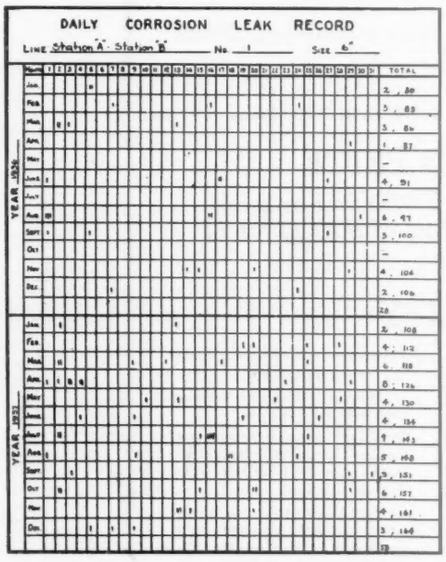

Figure 3

maintained in book form. This should include a complete description of the unit and its location, date of installation, type and description of ground bed, cost of installation, initial and periodic output and a record of repairs and changes made from time to time. It is important that the units be inspected at regular intervals and that their output be noted and reported with reasonable frequency. Arrangements can usually be worked out between the engineer and the regular line walker to have this information obtained and reported.

Among other useful report forms are those of a "perpetual inventory" type such as shown in Figures 3 and 4. With a form of the type shown in Figure 3 one can readily determine how many leaks have occurred on a given line to date, how many occurred during a given year or month and on what day a leak was reported. A summary of the information furnished on the "leak records" (Figure 1) should be maintained on a form similar to Figure 4. From this it is possible to classify by years or months the types of leaks, repairs, costs, damages, oil loss, etc. Such information is invaluable to the engineer who desires to report his accomplishments in an orderly manner.

Figure 5 is an example of the type of report which can be quickly prepared after a perusal of properly maintained records. The value of information of this nature, both to the engineer and the executive is obvious. A systematic and comprehensive system of records is fundamental to the achievement of control of pipe line corrosion.

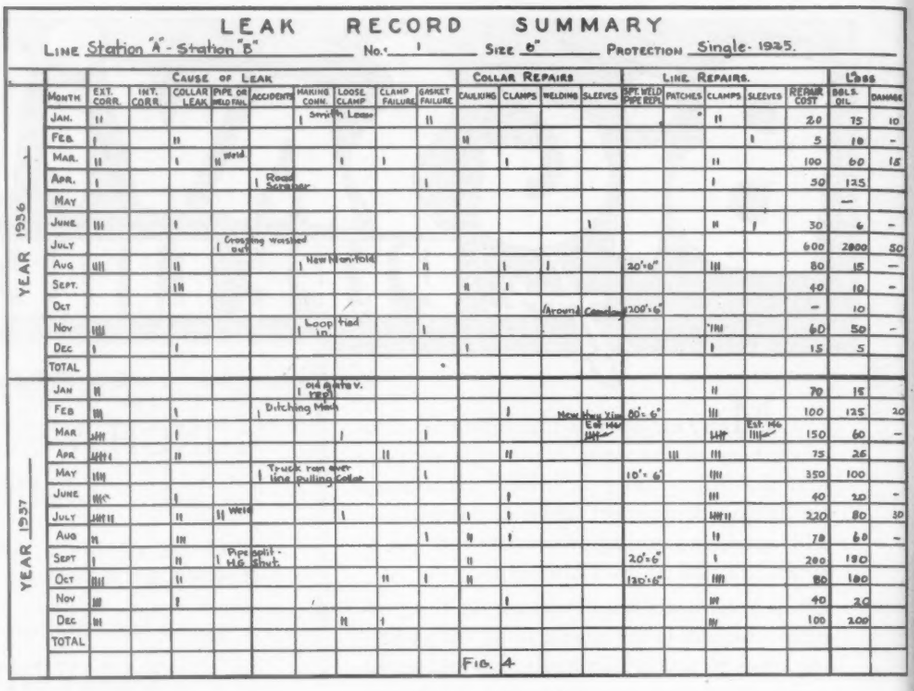

Figure 4

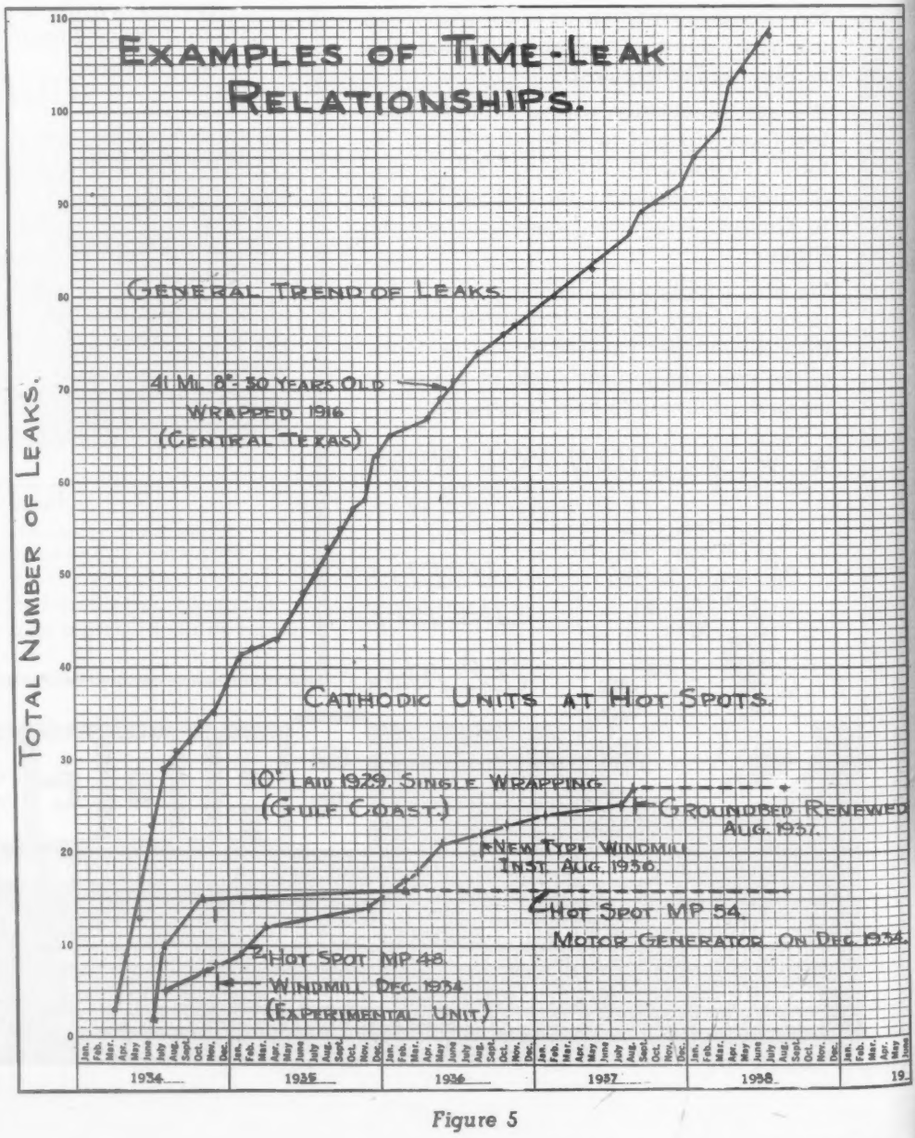
EXAMPLES OF TIME-LEAK RELATIONSHIPS.
GENERAL TREND OF LEAKS.
41 MI. 8" - 30 YEARS OLD WRAPPED 1916 (CENTRAL TEXAS)
CATHODIC UNITS AT HOT SPOTS.
10" LAID 1929. SINGLE WRAPPING (GULF COAST.)
GROUNDBED RENEWED AUG. 1937.
NEW TYPE WINDMILL INST. AUG. 1936.
HOT SPOT MP 54.
MOTOR GENERATOR ON DEC. 1934.
HOT SPOT MP 48.
WINDMILL DEC. 1934 (EXPERIMENTAL UNIT)
TOTAL NUMBER OF LEAKS.
1934
1935
1936
1937
1938

Figure 5

COMPRESSOR

Compact and Packed With Power

5. CHOICE OF 4, 6, OR 8 POWER CYLINDERS
6. 400 TO 800 HP AT CONSERVATIVE SPEEDS
7. ALL IRON CASTINGS MADE OF MEEHANITE
8. THOROUGHLY ENGINEERED BY COOPER-BESSEMER

CHAMPION "77" COUPLING

Drop Forged for Strength

Not a Casting

CHAMPION Pipe Couplings supply these features: Positively sealed connections that withstand fluctuating hydrostatic pressures up to 4,000 pounds and hold a vacuum.

Couplings are applied without any pipe preparation and therefore fit plain end, beveled or reconditioned pipe.

Joints are flexible but as strong and tight as the pipe itself.

Three kinds of gaskets are supplied: Oil-resisting, synthetic and steam-compound types.

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THE CHAMPION MACHINE & FORGING CO.

3695 E. 78th St. **Cleveland, Ohio**

New 10-inch Oil Line to Be Built in Arabia

With the discovery of a deeper, more prolific producing horizon at 4,700 feet at Damman, Arabia, California-Arabian Standard Oil Co. has started construction of a permanent camp at that location. Construction has also started on a 10-inch pipe line which will transport the Damman oil to a loading terminal to be built at the point of the Ras Tanura Peninsula slightly north and east of Tarut Island in the Persian Gulf.

The pipe line will be 40 miles in length, and a gravity system will be used from the Damman

California-Arabian Standard Oil Co.'s camp at Damman, Arabia, which is now under construction

structure to the terminal tankage. At the loading terminal, three 134,000-bbl. floating-roof tanks will be constructed to afford ample storage for tanker shipments. The terminal will be of the off-shore submarine-loading type, using 3,300 feet of sea line. Gas-driven centrifugal pumps will be used to deliver the crude from the terminal storage to the tankers. The sea line, and all sections of the cross-country line where corrosive soil is encountered, will be coated with asphalt-mastic pipe coating.

No substantial quantities of oil are now being produced at Damman. One well has been completed in the 4,700-foot horizon and two more are due for immediate completion. These will be shut in to await completion of the line and loading facilities.

The air-conditioned camp at Damman consists of 10 houses which have been completed, and five duplex cottages which are under construction. Plans are being made for a club house, shops and general camp utilities.

California-Arabian Standard Oil Co., the sole lease owner at Damman is a subsidiary of Standard Oil Co. of California. F. W. Ohliger is resident manager and H. C. Rector is assistant manager. W. G. Miller, who was formerly employed at Bahrein, has been placed in charge of all construction work.

The Marsh line includes gauges especially designed for: blenders, boilers, burners, capping, Christmas trees, columns, heaters, hydrogen units, instrument panels, pumps, Reid vapor bombs, scrubbers, separators, slush pumps, stills, towers, and other applications in all branches of the petroleum industry.

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Only Marsh Gauges combine the "Recalibrator", the "Master-gauge" movement, the "Unit Construction", the even graduations, and many other refinements. See your supply house or write for information covering the particularly *complete* Marsh line.

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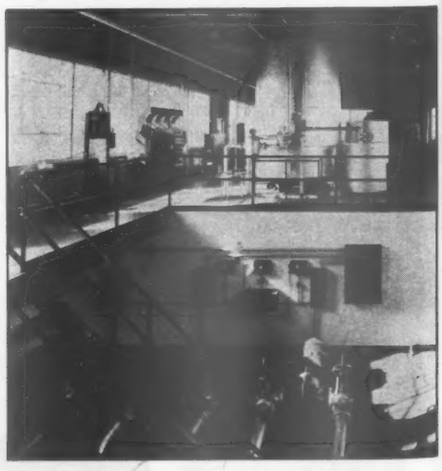

Auxiliary room at Panhandle Eastern station

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HUMBLE OIL & REFINING COMPANY
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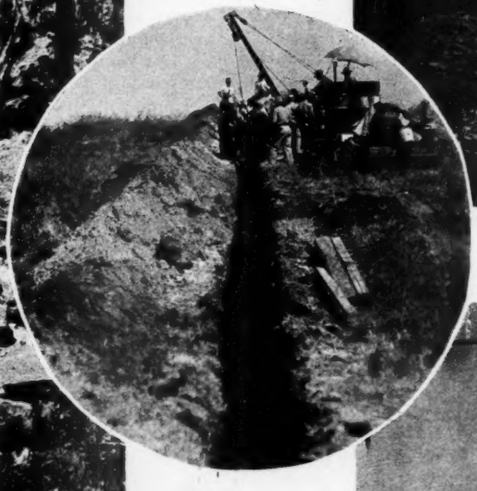
HOUSTON, TEXAS, U. S. A.

On coastal prairies . . .

Through swamps . . .

Down rocky hillsides . . .



In the light soils of upland country . . .

Beneath tidal waters . . .

Wherever pipelines are laid, experience dictates the use of one or more members of the Humble Rust-Ban family.

COMPRESSOR MAINTENANCE ON GAS LINES

By Paul Reed

Liberal compressor station, Liberal, Kans., Panhandle Eastern Pipe Line Co., compressor room with ten 1,000 hp. units

Compressor station maintenance on the long gas lines from the Texas Panhandle is planned to meet the requirements which each organization must face. Operating conditions differ from one line to another according to the variation in pressure schedules under which these trunk lines operate. For all of them it may be said that more is at stake in the outcome of maintenance schedules than on any other gas lines in the world. Therefore, there is reason for enumerating a few of the points, connected with station maintenance on some of these lines which will indicate where they differ and where they are similar.

Gas station engineers coming to these lines from the interconnecting systems of some of the older states are impressed with the exacting conditions which exist. A long gas line represents a large investment, the profit from which may be materially reduced, unless every station functions satisfactorily during periods of peak loads which occur during cold weather. At such times, the failure of compressor equipment at one station has the same effect as having the same failure occur at all the stations, since the capacity of the whole line is reduced. Because of this situation, superintendents have given special attention to organizing routine so that there may be a uniformity in practices as well as in procedures for reporting details which indicate the condition of mechanical equipment. The problem of keeping records which will be complete and convenient gives considerable concern.

Before giving a brief outline of the general methods adopted for organizing overhaul work, keeping track of the condition of mechanical equipment, watching operations, and providing for the elimination of sources of trouble, it may be appropriate to mention a few points regarding operating conditions in those lines from the Texas Panhandle which transport gas to the North Central states. Discharge pressures on certain lines vary between 320 pounds and 430 pounds in summer and somewhere between 420 pounds and 500 pounds in the winter. A line operating with a high load factor the year round operates with 680 pounds discharge pressure in summer and more than 700 pounds pressure in the winter.

Due to the nature of industrial consumption, the greatest changes in the amount of gas to be delivered occur over week-ends. To increase deliveries, it is necessary to start several days ahead by increasing pressures, beginning at the Texas end and steadily building up pressure all along the line. One gas pipe line which maintains its own communication system for transmitting pressure orders from the dispatcher and hourly reports from the stations, makes a practice of having each station report weather and temperature on the hourly report, thus providing the means for forecasting weather conditions frequently, for which preparations should be made further up the line. In order to facilitate the execution of pressure orders on the part of station engineers, one superintendent of compressor stations has furnished stations with a simplified form of chart which is easier to interpret than those ordinarily used for determining discharge pressures to be obtained under various conditions of suction pressure and pocket adjustment.

Practices in regard to overhauling engines differ with the situation confronting each company. Where only a fraction of the units are operated through the summer, this season is used for overhaul work which is undertaken by engineers and oilers at the stations. On lines which operate through the summer with a high load factor, there are distinct advantages in having overhaul work put in the hands of a repairman who makes the overhauling of compressor units a year around proposition.

One line following this policy keeps the maintenance foreman and his crew continually busy; engineers and wipers can do overhaul work and are sometimes called in to assist. At a station of this line, there are eight men on a shift, two engineers and six oilers; one of the engineers operates while the other one attends to light maintenance. Each shift looks out for light maintenance on four units, with the exception of one shift which works on three.

On other lines where overhauling is done in the warm months, it has frequently been found to be advisable to have one of the engineers who has a special aptitude as a mechanic take the re-

Centralia, Mo., station, Panhandle Eastern Pipe Co.

sponsibility for overhauling under the supervision of the chief engineer. There are advantages resulting from the uniformity with which a good mechanic does his work. However, some superintendents assert that while there are gains to be made through specialization, it is necessary that the regular operating crews at stations be prepared at all times to make any repairs which are necessary. One superintendent, who stressed this point, mentioned the fact that, when transfers were to be made, he tried to plan these so that in the course of time there would be one man at each station with a fair knowledge of welding, another man with ability as a machinist; and another with knowledge of the electrician's trade. These men would have no special ratings; the presence of these men at the plants is considered to be a valuable asset to the company as insurance of greater continuity of operation, particularly during periods of the cold weather peak loads.

An annual overhaul for each engine is customary on the lines from the Panhandle, although an exception is sometimes made in the case of a unit which has run less than 2,500 hours; in such cases between 2,500 and 5,000 hours of running time, pistons, rings, etc. are checked; and checks are made every time an engine is open. During the annual overhaul, which usually keeps the six men in the overhaul crew occupied for more than ten days, a complete check of the unit is made and any part is replaced which is likely to give trouble before the next overhaul.

It is often a custom to make notations regarding overhauling on the daily report from the station; more complete data goes on the weekly report. Some companies make a practice of having a letter written to the central office reporting the condition of the unit when the overhaul work is completed. Special forms have been adopted by some companies for reporting measurements of power and compression cylinders. At the central office these are used in keeping records which show the original sizes, sizes at the latest overhaul, and the changes due to wear; hours run are frequently shown in another set of records. Breakages are not reported on special forms; however, a type of report, known as the Material Complaint Report, has been found to be useful for calling the attention of the management to failures due to unsatisfactory material or mechanism.

Comparison of monthly lubricating oil records has been found to be a means of providing the superintendent at the central office with a sensitive indicator, showing the condition of units all along the line. An oil record which has proved to be satisfactory shows: station number, engine number, hours run, gallons of oil used, square feet of area lubricated per gallon; these data are tabulated for each month and cumulatively since the first of the year.

One of the gas lines from the Panhandle, which has a communication system, has hourly reports come in from each station to the dispatcher's office showing the temperature, the weather, intake and discharge pressures, number of engines, and r.p.m. These are reported on a large sheet, on the back of which, space is provided for notations regarding interruptions and orders. On another form of daily report, information is recorded every hour showing, in addition to the above, temperatures of inlet and outlet jacket water, suction and discharge gas, cooled gas and atmosphere; notations are also to be made regarding lubrication and fuel consumption.

The weekly report may be a brief summary or it may go into such details as horsepower hours per gallon of oil used, fuel gas used per horsepower hours, compressed gas per actual horsepower hours, consumption of raw and treated water used, and the number of gallons of water used per horsepower hour, together with the pounds of chemicals used in treating; kilowatt hours and fuel gas used per kilowatt hour generated. The monthly report is likely to be a general summary.

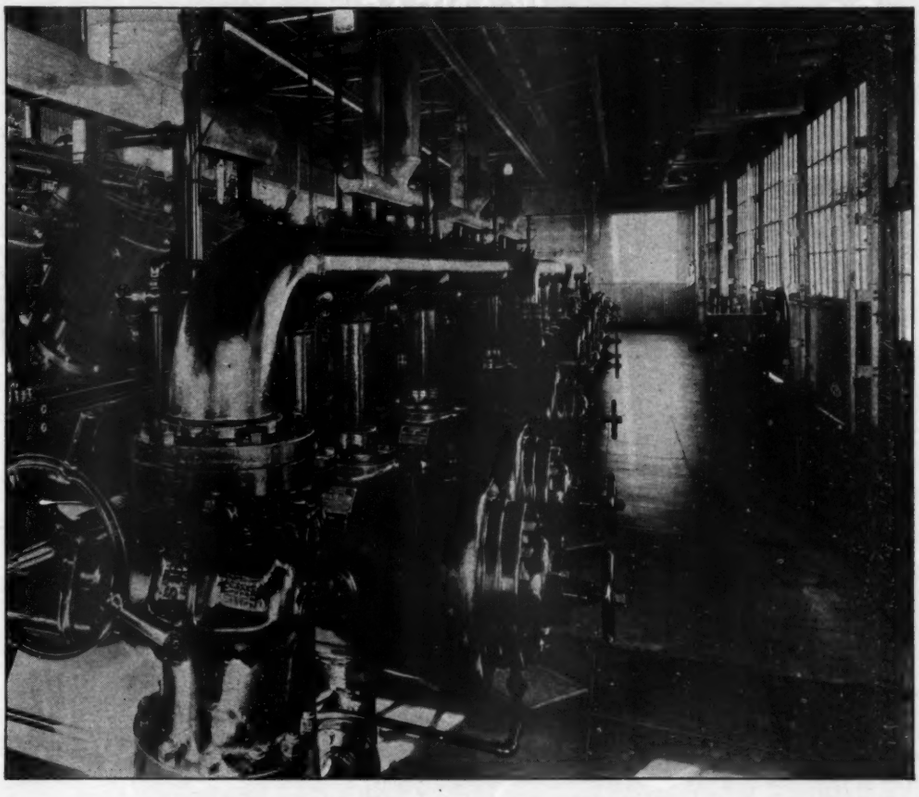
There has been an increasing amount of attention given to keeping out the things which give trouble in operating machinery at compressor stations. Centrifuges have proved to be valuable in removing dirt periodically from the lubricating systems. A system, which has been found to be convenient, is to have the centrifuge located in the machine shop, where it is connected by piping with each unit. The oil from each engine is cleaned in rotation. On the gas lines from the Panhandle there are a number of stations, which are hard hit whenever a dust storm comes along. With the use of a centrifuge, it is claimed, there is less breaking of filter bags while operating when there is a great deal of dust in the air, for the centrifuge removes, from the oil, particles which give trouble.

Considerable attention has been given to air filters which are widely used. At some stations, installations have been made to provide air conditioning which is used during dust storms. Dehydration plants for removing water from the gas have proved to be useful safeguards against freezing of the line. A number of gas compressor stations have machine shops which are well equipped; one shop at a station in Kansas has two lathes, a shaper, drill press, power saw, and grinder. Futhermore, equipment for water treatment has become important at compressor stations in recent years.

If compression stations could be operated without having to contend with troubles due to dirt, a number of mysterious causes of interruption could be eliminated. Such troubles require ingenuity on the part of station crew to get rid of them; they also interfere with hard and fast rules being laid down as to the routine which the crew should follow while on duty.

At one station where orders had been given to examine bearings once an hour, there was an inclination to follow this rule to the letter although the crew knew that there were some bearings which needed to be watched at more frequent intervals. One night a bearing burned out within 20 minutes after it had been examined; the cause was found to be sludge in the line as the result of dirt from a dust storm, several weeks before, which had mixed with the lubricating oil and stopped up a line at one point.

In the maintenance of gas compressor stations, a paint code prescribing colors to be used in various parts of the plant has been found to be important. Great care has been given to maintaining floors. In this connection it might be mentioned that at one station, a satisfactory way of protecting floors while overhauling a unit, was found to be the use of carton material obtained from the packing room of a local furniture store; this made a good floor covering where the men were working. Such material comes in large pieces; it protects the floor against bruises and scratches better than canvas since it is somewhat resilient; when the carton material is greasy at the end of the overhaul job, it can be burned.



Compressor station equipped with ducts used in air conditioning in dust storms. United Gas Pipe Line Co., Shamrock, Tex.

In the section entitled "Practical Suggestions" in this issue, several devices are shown which have been designed by engineers and repairmen for improving compressor station maintenance and operation. Among these are a gooseneck for removing exhaust valves, a davit for a centrifuge, and a method for protecting pop valves.

In conclusion it may be said that maintenance programs must justify themselves by making money for the company. Since the amount of detail involved in the management of a large trunk line is more than can be carried in the memory of a man it is necessary that adequate records must be kept which will guide the superintendent in operating the line economically.

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PIPE LINE CURRENTS

By J. Campbell Stirling
Stanolind Pipe Line Co.

In 1927, while inspecting the corrosion on a line that was being taken up in the Mid-Continent field, an investigator for the National Bureau of Standards observed that where the line passed through a certain soil stratum corrosion was severe, while it was a minimum in another stratum. Measurements of differences in potential along the line indicated the presence of electric currents. These currents were different at various points on the line, but were seemingly steady and varied little from day to day. The direction of current flow was different at different points and reversals were observed. There was apparently more corrosion in the areas where current discharged than in areas where the current was collecting. The conclusion was reached that the passing of the line from one soil to another set up a galvanic cell, the electrodes of which could be very close together or several miles apart.

Logan, Putnam, and Rogers presented a paper on "Pipe Line Currents" at the annual meeting of the American Petroleum Institute, in 1929. In this paper they presented the results of the measurements of electric currents on pipe lines far removed from any electric railways. Prior to that time the presence of electric currents on pipe lines had usually been attributed to electric railways.

During the early part of 1930, Gill and Rogers presented a paper on "Electric Currents Carried in Pipe Lines" in which they definitely attributed the observed currents to galvanic action.

The fact that none of these men found any striking correlation between areas of current discharge and corrosion, even though they did observe measureable electric currents, prompted the Bureau of Standards to extend the scope of the investigation to see if any relation existed between such corrosion and line currents.

Necessary arrangements were made with the managements of several pipe line companies to cooperate with the National Bureau of Standards, so in the spring of 1930 E. R. Shepard conducted an investigation on the relation of pipe line currents to corrosion which covered the exploring of lines in Kansas, Oklahoma and Texas. It was my privilege to cooperate with him in experimenting on three different lines in Kansas and Oklahoma.

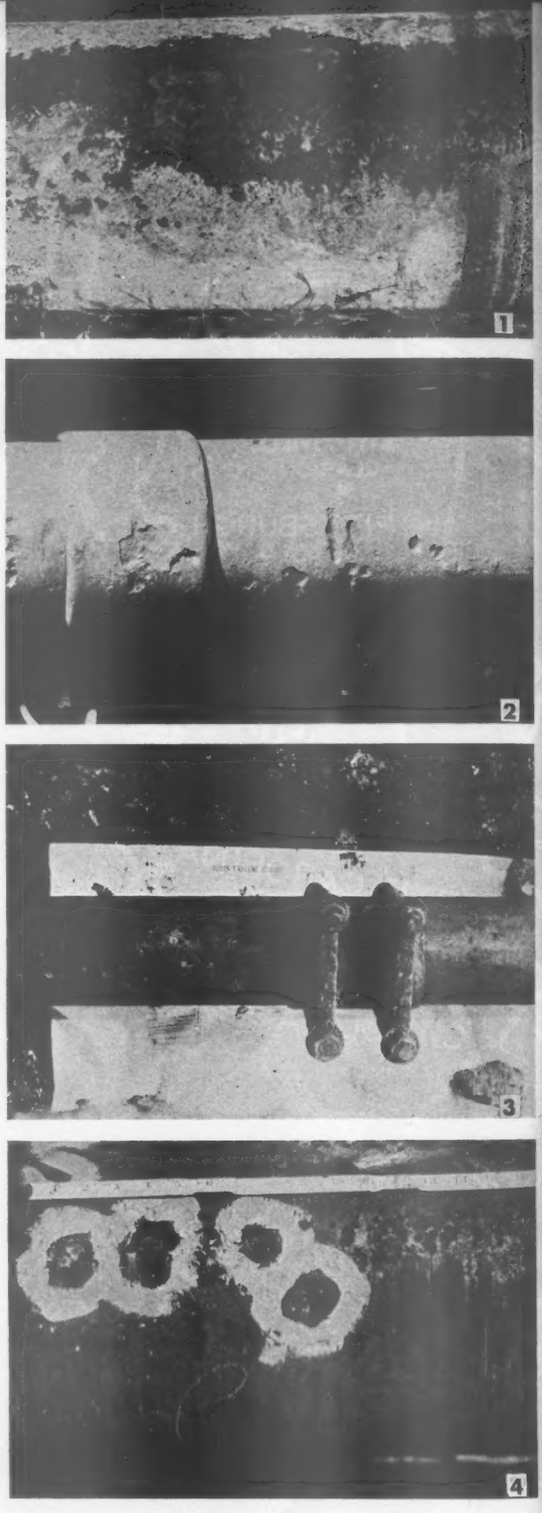
It was soon evident that the currents observed were largely of galvanic origin. Abrupt changes in magnitude indicated that the currents originated and disappeared at the pipe surface. In most cases currents were found to be flowing into tank farms. These facts, combined with the finding of currents on isolated sections of pipe lines, are not consistent with the assumption that electric railways are responsible for all the currents. Currents were found to be flowing from both directions into some areas and to be flowing away from other areas in both directions. A detailed survey showed that in some cases the current accumulated on the pipe over a large area and discharged from the pipe over a small area.

A study of the soil along the lines showed that as a rule the areas of abrupt current discharge were in soils having a low electric resistance, while the areas of collection were in soils having a normal or high resistance.

Weidner and Davis presented an article, "Relation of Pipe Line Currents and Soil Resistivity to Corrosion," at annual meeting of American Petroleum Institute in November, 1931, in which data were given correlating pipe line currents with corrosion. As a result of corrosion surveys, other engineers have furnished information confirming the assumption that there was a correlation between pipe line corrosion and pipe line currents. Data accumulated by my company from similar surveys, on 650 miles of buried pipe line, also tend to verify the findings of other investigators. However, difficulty is experienced when one attempts to locate corroding pipe by use of pipe line currents.

In dealing with electric currents on pipe lines it is necessary to be concerned with several different classes. Although these classes are basically different, they overlap and one is likely to encounter a summation of several different currents.

1. *Stray currents* from street railways were the first class of currents known to exist and at one time they were credited as being the cause for all corrosion occurring to buried metallic structures. The fallacy of such a belief was proven with the discovery of galvanic currents but the word electrolysis is still applied erroneously by some when speaking of galvanic corrosion. Electrolysis is the analysis of metal brought about by electricity, so that the word is used correctly only when it refers to corrosion resulting from stray currents. It is my opinion that electrolysis is experienced in few localities. There are probably only two areas along my company's system of 7,000 miles of pipe line where electrolysis is responsible for the deterioration of the metal. We have no cases of corrosion that we can attribute to alternating currents.



No. 1. Corrosion caused by stray currents; No. 2. Local galvanic corrosion resulting in short line currents; No. 3. Pipe from road crossing; No. 4. Pipe from alkali soil area; long line galvanic currents were present.

2. *Short line or local galvanic currents* are basically electrolytic, and are generally accepted as being the result of electro-chemical action. They may be caused by a great variety of conditions, but for the present it is necessary only to recognize the fact that these cells are local in nature. The current involved flows between adjacent sections of the metal surface. This flow may be either longitudinal or circumferential. The electric circuits are small in extent because of the plentiful supply of cathodic pipe surface adjacent to the corroding areas. Figure 1 is intended to illustrate short line or local galvanic currents.

3. *Transitional galvanic currents.*—As the anodic or corroding areas become larger in size the short line or local galvanic currents increase in length. At this stage they may be considered as transitional galvanic currents as they are between the short line currents and those that flow over a considerable length of time. This condition, illustrated in Figure 2, will produce measureable currents, but they are not as a rule long enough to be detected by a current survey. Typical examples of transitional galvanic currents are found in road and creek crossings.

4. *Long line galvanic currents*, illustrated in Figure 3, are those that flow over a considerable length of time. The extent of such circuits depend on the area of pipe corroding. In this figure the

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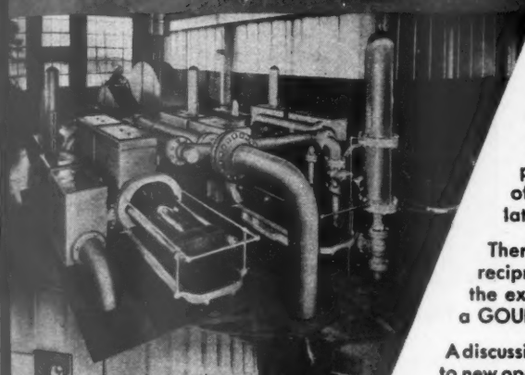

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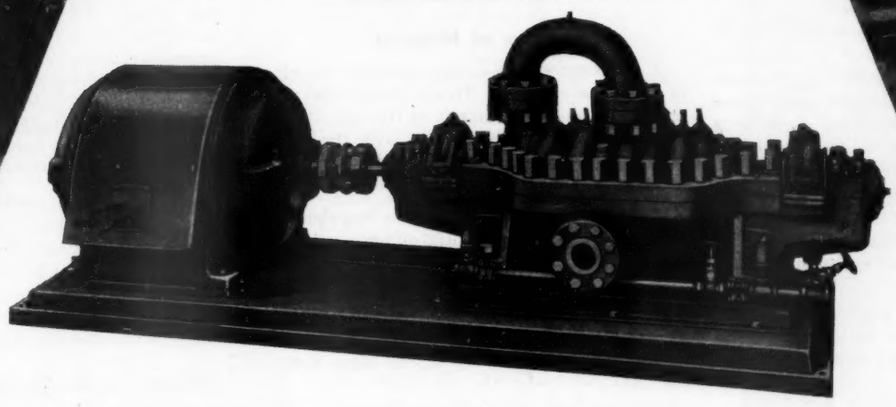

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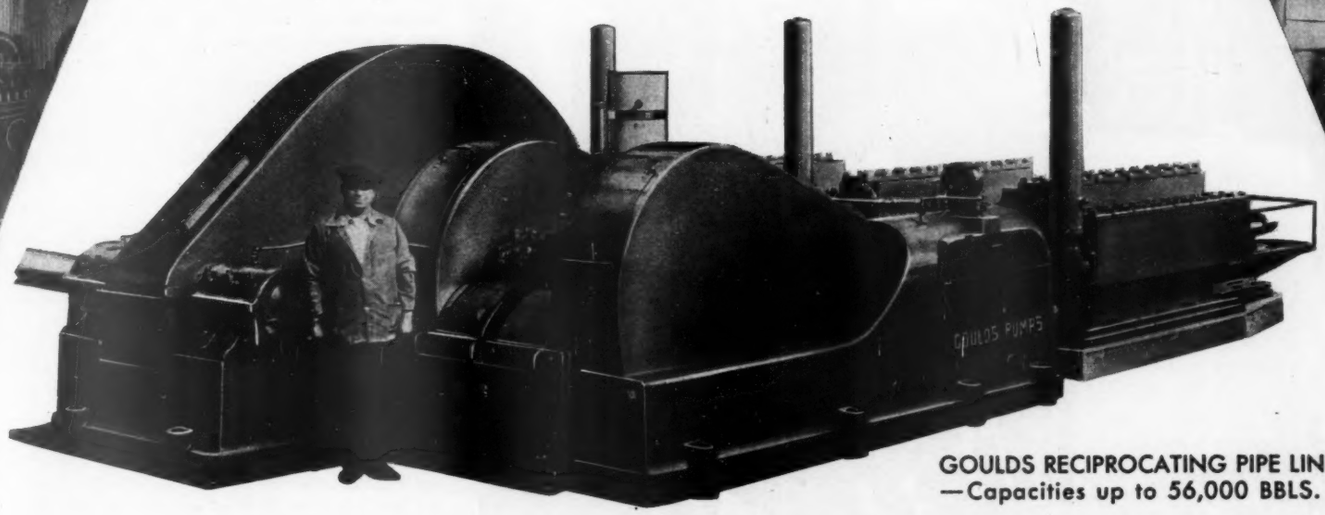

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entire pipe surface in the corroding area is seemingly discharging current, which is seldom the case, but the proportion of the pipe surface undergoing deterioration is often very great. These currents are the result of galvanic action. They are not of such magnitude as to cause deterioration of the pipe, they are only indicators as to the location of the affected pipe. Galvanic currents are present and can be detected on such accumulations of metal as bridges and racks of pipe.

Since it has been proven that galvanic currents do exist on pipe lines, I shall describe some of the possible sources of electromotive force.

Some Sources of Galvanic Currents

As it has been explained, observations do not show galvanic currents to have the characteristics of current originating at electric railways. Among the possible sources of galvanic currents are the following:

1. *Soil properties.*—Probably the most important factor responsible for the presence of galvanic currents on pipe lines is the potential difference of the soils through which the line passes. If the pipe is buried at the junction of two soil strata of different chemical compositions, there will be a difference of potential between the two areas of pipe. Often there is a difference in potential between the top and bottom of pipe. If there is no chemical difference in the soils but one contains more moisture than the other, again there will be a difference in potential because of the difference in the concentration of the *dissolved salts.* Even if the soils have the same chemical composition and soluble salt concentration there will be a difference in potential if there is a difference in the concentration of *dissolved oxygen or gas.*

In my opinion the gas concentration is the most important cause of potential difference. Putnam has observed potential difference as high as 1.4 volts where there was dissolved gas in one section and none in the other.

In most cases the corrosion is more severe on the bottom of the pipe than on the top. This is the result of the bottom of the pipe making good contact with the soil in the bottom of the ditch which has not been disturbed or aerated. This soil contains more dissolved salts and gases than the loose soil on the top and sides of the pipe. If there is a corroding chemical in the soil it attacks the metal pipe, thus creating a galvanic cell and producing electric galvanic currents. The bottom of the pipe is naturally anodic because it is in good contact with soil containing dissolved salts and gases; therefore, the currents thus generated discharge from the pipe into the bottom of the ditch and return through the soil to the top of the pipe.

2. *Mill scale* on pipe not continuous causes a potential difference between the mill scale and the iron. Putnam has observed potential differences of 0.45 volt.

3. *Red rust,* usually ferric hydroxide, is cathodic to iron by about 0.65 volt.

4. *Dissimilar metals* in electrical contact and buried will generate galvanic currents. Similar action occurs between new lines and old lines, where the old lines have become covered with a hard thick layer of rust.

5. *Variations in the depth at which pipe lines are buried* result in differences of potential. Such a potential difference is due to encountering different strata of soil. This soil, as a result of handling, is changed from one of several different strata to a heterogenous agglomeration.

Effect of Moisture

6. *Seasonal variations* influence the magnitude of pipe line currents. This is likely due to the change in moisture content of the soil. Currents seem to fluctuate considerably with the wetting of soils but they return to normalcy when the soil has become saturated.

7. *Strains, inequalities, or the segregation of impurities* may cause potential differences between different sections of the pipe.

8. *Earth currents* have been shown by Louis A. Bauer to vary in magnitude and gradually shift in direction. The potential gradients in the earth as reported by Bauer are of the same order of magnitude as those observed along pipe lines. Gish relates that Logan recorded fluctuating currents on pipe lines in 1929 in California at a time when a magnetic storm was occurring which made it possible for him to definitely establish the connection of these fluctuating currents with the general system of electric currents which circulate in the earth's crust. Earth-current storms may cause fluctuating currents to follow pipe lines but it is my opinion they are of insufficient magnitude and exist for too short a time to produce or accelerate corrosion. However, earth-current storms may seriously interfere with a study of long line galvanic currents.

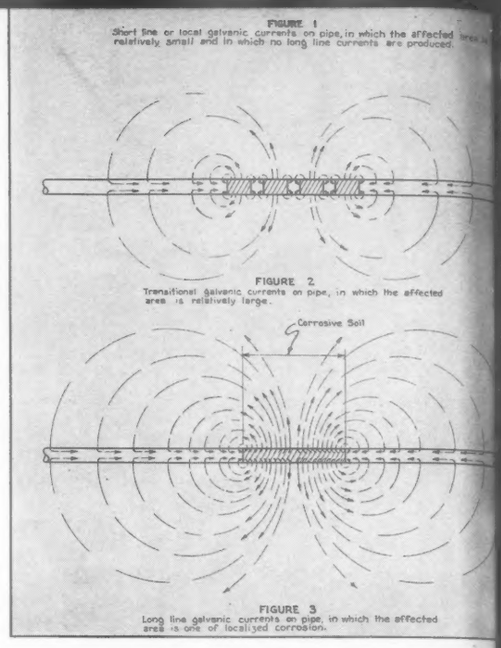


FIGURE 1
Short line or local galvanic currents on pipe, in which the affected area is relatively small and in which no long line currents are produced.

FIGURE 2
Transitional galvanic currents on pipe, in which the affected area is relatively large.

FIGURE 3
Long line galvanic currents on pipe, in which the affected area is one of localized corrosion.

Three types of galvanic currents on pipe li

9. *Pump stations and tank farms,* with a few exceptions, have been found to be points of discharge for pipe line currents. This may be the result of a difference in potential between the tank bottoms and the pipe lines, or it may be difference in metal or soil moisture, but most likely it is because of the dissolved gas or oxygen supply.

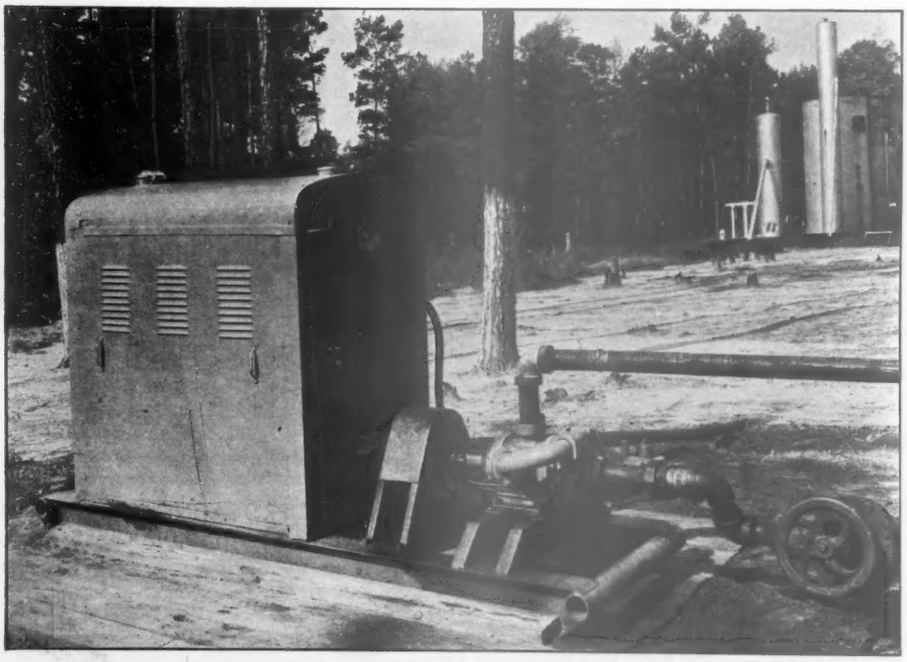
Methods for Measuring Pipe Line Currents

Measurements of the flow of currents on pipe lines may be made by two methods: first of these is by measuring directly the flow of the current or potential drop along the line; second is by measuring the flow of the current through the soil in contact with the pipe. The method first named is more practical and more applicable to the measuring of long line galvanic currents. Potential drops can be measured with either a millivoltmeter or a potentiometer. The potentiometer being more accurate, because it consumes no current, is preferable.

Conclusion

It is my opinion the currents on pipe lines (except those in areas infested with stray currents from electric railways) are in most part the result of chemical action of soil solutions on the pipe and that the currents originate on the pipe surface. If my assumption be true the laws of electrolysis are not applicable to pipe line corrosion.

If we assume that the currents do not originate on the surface of the pipe but are engendered by electrolytic potential differences, independent of the line, then the laws of electrolysis hold. But, if this be true we shall have a complex case of battery action and from our knowledge of the phenomena of pipe line currents we will know that the currents found on any pipe line will be the resultant or summation of currents from many sources.



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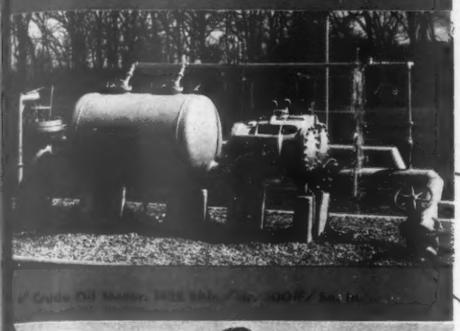

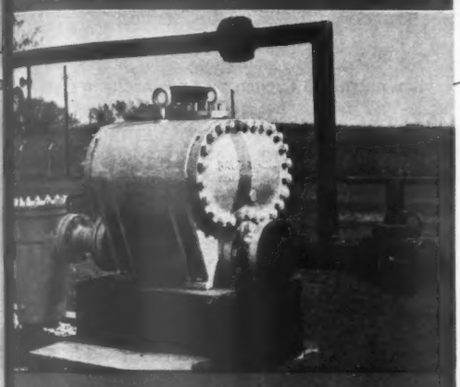

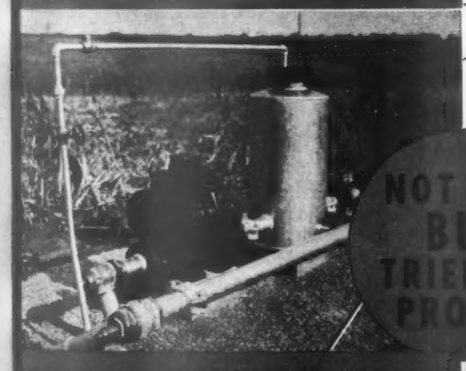

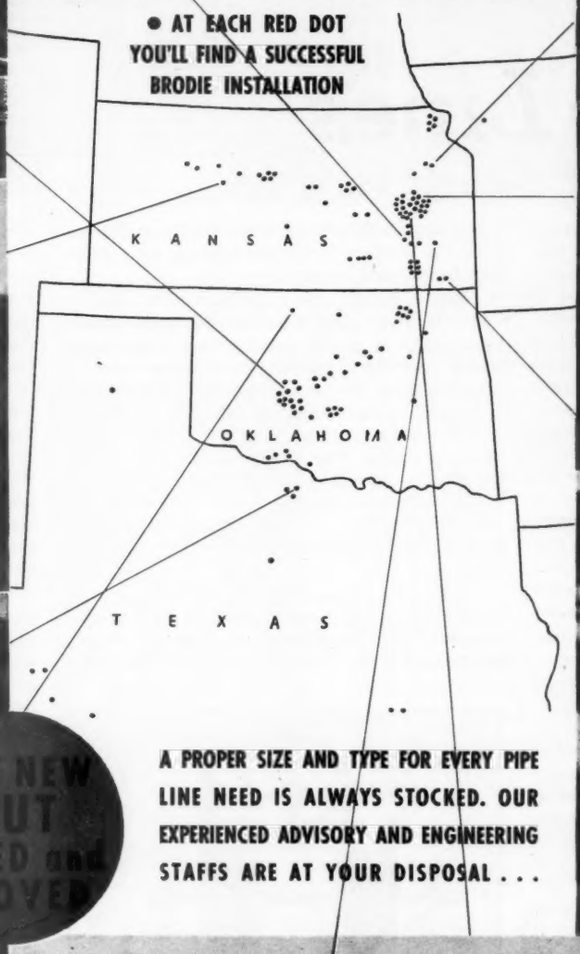

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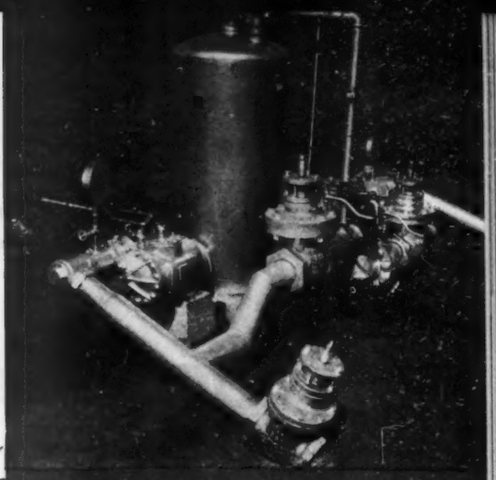

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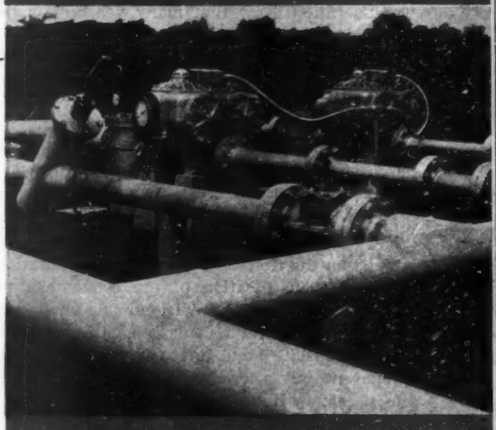

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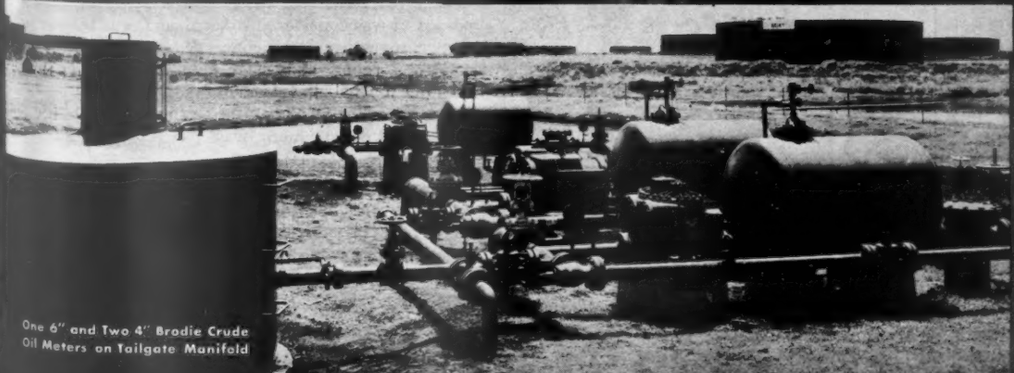

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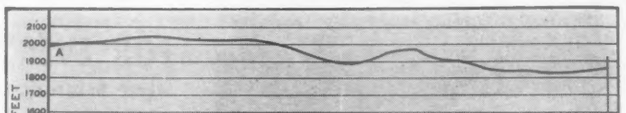
Developments in the Evolution of Scrapers for Gasoline Lines



Study of line section contours between stations

Before attempting to elaborate on the evolution of a scraper suitable for gasoline pipe line service, it should be clearly understood that it is not intended to detract from the capabilities of the original design of scraper which has proved so successful in crude oil pipe line service. The idea of having to use scrapers to maintain maximum throughput where gasoline lines are concerned was generally given a cynical reception where the lines were originally constructed and very meager facilities were installed to accommodate this phase of operation. Now that many years of operating experience have been acquired, one might be tempted to criticize unjustly the scant arrangements originally provided for scraper movements: however, it must not be overlooked that the product in transit was finished refined, and so far as the pipe line company was concerned, it did not contain the abrasives and other line obstructing constituents usually associated with crude oil.

The high overall line efficiency, when viewed from a capacity and pressure standpoint resulting from the first several months of operation, indicated a justification of the economical policy adopted towards the provision made for line scraping, and this was particularly significant when reduced capacities and increasing pressures became apparent only after the first year of operation. In fact, certain line sections following a contour of relatively even grade did not indicate any appreciable change in overall line efficiency, even after two years of operation, and it looked as if those specific sections would maintain a high efficiency value for an indefinite period.

Sediment Accumulation

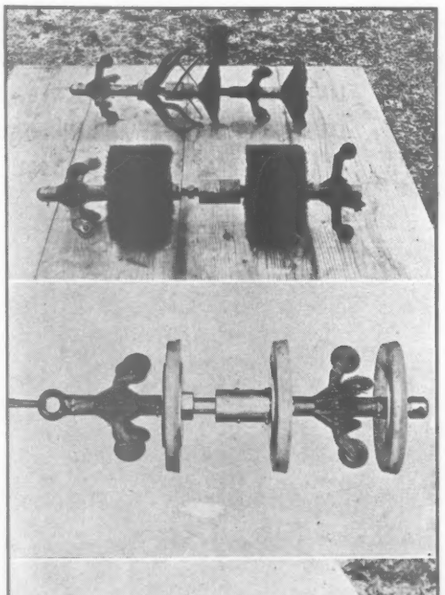
Line restriction by reason of sediment first became prominent in gathering lines and main line sections adjacent to the gasoline's point of origin and capacities declined as much as 11 per cent while maximum discharge pressures remained constant. Eventually, capacities in certain sections which by reason of continuous single line operation determined the daily throughput for the trunk system as a whole, decreased to such an extent that the scraper method of eliminating the obstructing sediment became predominantly imperative.

To compensate for the attendant hazards for which no empirical knowledge existed, if it should become necessary to cut the line in the event of a scraper jam, it was thought expedient to run the first scrapers, which incidentally, were of the knife head and leather disc design in the center of water slugs approximately 15 miles long intersticed between the gasoline tenders. The line cleansing achieved by this process, while helpful and desirable, fell far short of the anticipated results. It did, however, accomplish one commendable feature when skids, rocks and sundry fabricating equipment inadvertently or maliciously placed in the line during construction were definitely located and removed.

After a series of trying experiences, some of which involved cutting sections between stations in as many as a half dozen places, a procedure which naturally incurred considerable loss of pumping time, it was decided that the line was sufficiently clear of large restricting obstacles to permit a definite scraper-running schedule to be put in operation. The problem of carrying out all the details connected with a schedule of this kind, while burdensome and impractical, did accomplish one significant feature when it focused the limelight on the inadequacy of the station straining equipment.

The continued use of water as the scraper conveying liquid was accepted as axiomatic for quite some time after its inception and it probably would still be part of the standard cleansing system were it not for the corrosive characteristics attributed to it when entrained oxygen was present as a constituent. The weight per unit volume of water, which is approximately 26 per cent greater than that of gasoline, endows it with an indubitable buoyancy advantage that helps scrapers run in conjunction with it to carry a sediment load greater in weight by a percentage approximating the difference in specific gravity between the two liquids. The physical properties of water, particularly its cohesion, adhesion and viscosity, are especially objectionable because gasoline with its lower specific gravity, less cohesive qualities and lower relative viscosity, usually channels over the layers of slower moving water trapped in the sagging contours of the line.

The freezing hazard that exists in zones subject to severe winter weather necessarily limits the time and defines the seasonal period during which water may be used in these zones, and despite the fact that reasonable forecasted time periods estimated to allow the water to be completely purged from the line have been attempted, it is not uncommon for dilatory moving water columns that settle in line sectors of low relative elevation to freeze and curtail the daily throughput.



Scrapers used in gasoline pipe lines

Group of Scrapers

The cleansing limitations of the scrapers initially used were quickly realized when the group system of scraper transmittal was established and a new design scraper was adopted to replace the pioneer type which, while satisfactory from a structural viewpoint, can now only be classified as the progenitor of the type which is at present the chosen standard. With the advent of the latter scraper, the dominant characteristics of which included circular steel wire brushes to cleanse the pipe wall, large diameter guide wheels to more easily bridge the gate valve ports and increase sediment carrying capacity, it was necessary to redesign the transmitting and receiving facilities at the main line stations.

The booster stations were not equipped with scraper traps and when a group of scrapers in pipe line transit was expected to pass these points, it was necessary to shut down the boosting equipment and accept the attendant decrease of liquid velocity as inevitable until all the scrapers had passed. It was considered suicidal, as far as booster station machinery was concerned, to attempt receipt of scrapers at booster plants, and the facilities to receive and transmit scrapers at those points were installed only after the dependability of tank type strainers was practically demonstrated.

The piping plan should exclude any doubt regarding the hazards involved when receiving scrapers at booster stations. When one considers that there is no tankage at these points and that

the close tolerance pumping equipment is of a type that depends primarily on speed for its high capacities and pressures and that, incidentally, it will not operate on a negative suction head, it is quite easy to excuse the skepticism that greeted the proposal to install scraper facilities.

A study of the line section contour between adjacent stations, in which it is necessary to run scrapers, will often disclose latent peculiarities and help to determine the minimum number of scrapers that should be transmitted through the particular section under survey. Perhaps a mathematical analysis of the graphically depicted topography of a 25-mile section of 8-inch I. D. pipe may be of interest. Because of the lack of certain experimental equipment and without ample grounds to justify its purchase economically, certain assumptions must be accepted as axiomatically correct in arriving at the conclusions that follow.

Assume that the 25-mile section of 8-inch pipe has its liquid tonnage capacity restricted by an internal coating of 1.3 specific gravity foreign matter 1/32-inch thick, evenly distributed over the welded pipe perimeter, the total weight of the obstructing matter in the 25-mile section equals,

$$\frac{(8^{2}-7.937^{2})\times.7854\times63360\times25\times.036\times1.3}{2{,}000}=29 \text{ tons}$$

WHEREIN:

8″ = Line I. D.
1/32″ = Sediment thickness
7.937″ = I. D. of sediment ring
63360″ = Inches per mile
25 = Miles per section
.036 = Weight water per cubic inch
1.3 = Sediment specific gravity
2,000 = Lbs. per ton
.7854 = Constant

Evidently a visualization of the flow characteristics and line grade elevations prior to scraping should help discern the actual dispersion of the sediment after the movement of each scraper group. Flow conditions at the low pressure end of the line are often unpredictable and this is true particularly where the pressure heads resulting from abrupt changes in line elevation are great enough to cause partition of the liquid column's continuity.

To prove the contention that all line sections cannot be cleaned by following an identical procedure with a specific type of standard scraper, one has but to refer to records indicating the inability of these scrapers to raise the section efficiency through increased capacity while maintaining the maximum discharge pressure constant. Sections of relatively even contour are quickly cleaned and the high efficiencies resulting are generally maintained as long as extended shutdown periods do not immediately follow.

In direct opposition to the section that is readily cleaned is the gasoline pipe line system, the topography of which decrees, that it is obstructed by sediment that often restricts the throughput capacity of trunk systems between points of origin and destination; it is generally considered suitable to concentrate all line cleaning activity at particular points.

To continue the scraper evolution discussion there has been one notable advance, namely the substitution of rubber sealing discs to replace the leather and fabric that were accepted as standard for so many years. The rubber disc, in contradiction to some popular concepts, is not impervious to slight solubility with gasoline, and for some time after direct contact with this liquid it continues to increase in diameter, an advantage within definite limits, of course, that compensates for the circumferential perimeter wear that the disc is subjected to in traversing a specific length of line. In addition to this, the resiliency of the rubber, which in this instance may be classified as its ability to assume any pattern within the pipe

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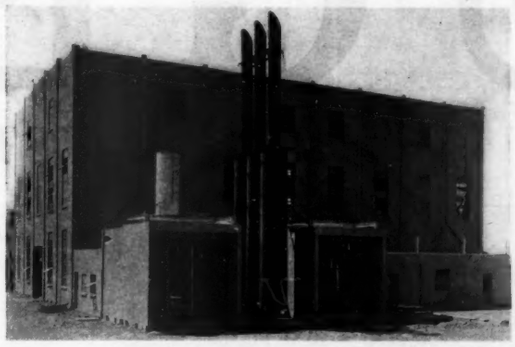

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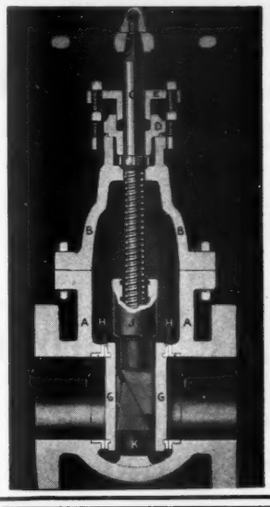

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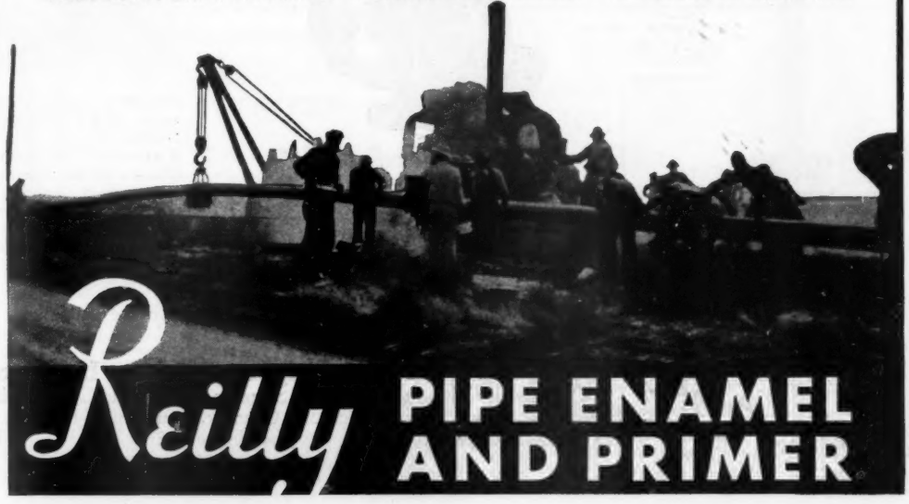

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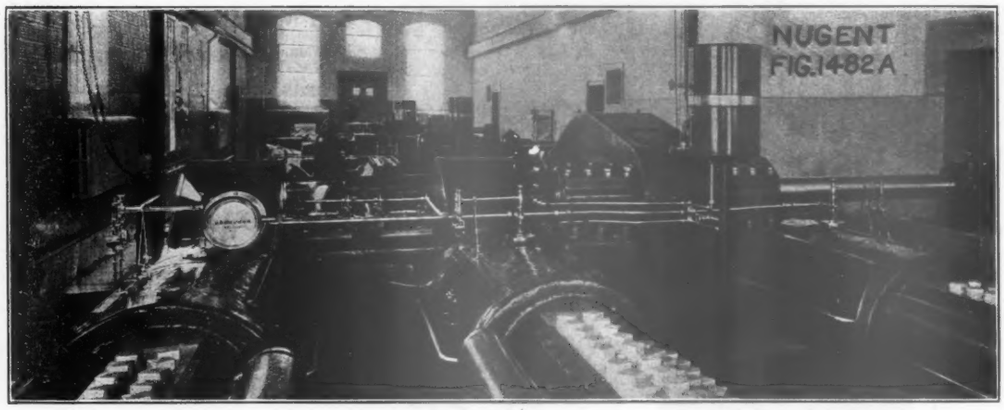

Interior of one of the Pumping Stations of a Pipe Line serving the Mid-Continent field, showing Nugent Individual Oiling and Filtering Systems on each pump. Other stations of the line are similarly equipped.

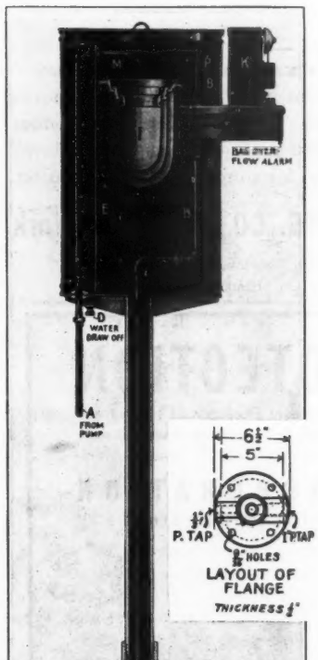

Fig. 666, Nugent Patented Combination Pedestal Oil Filter and Reservoir. Filtering capacities 6 to 24 G.P.H.

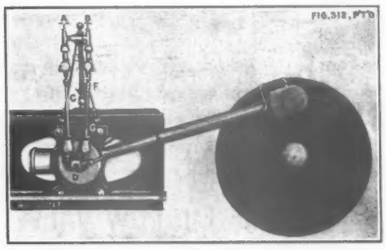

Fig. 312, Nugent Patented Force Feed Telescopic Crank Pin, Crosshead Pin and Top Guide Oiling Device.

Fig. 35B, Rotary Oil Pumps to elevate used oil to the Pedestal Filter.

Fig. 80N, Nugent Patented Sight Feed Needle Valves with Removable Sight Glasses for easy cleaning without stopping the flow of oil. These regulate the flow or drops of oil to each bearing.

Fig. 713A, Nugent Compression Union Pipe Fittings with tubing for conveying the oil are made in tees, adapters, crosses, valves, elbows, etc. No threading. No leaks. Much easier and quicker to install than ordinary threaded piping and fittings.

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Oil Filters, Oiling and Filtering Systems, Telescopic Oilers, Oiling Devices,
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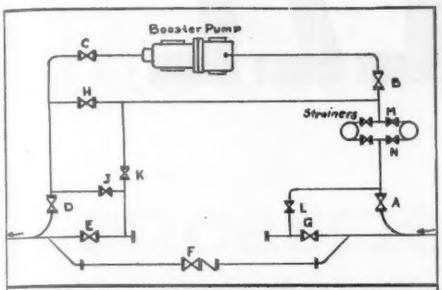
line's internal sphere, has greatly reduced the tendency of scrapers to stick on projections that positively stopped those of the initial design. It must not be overlooked, however, that discs incorporating resiliency characteristics that are incapable of producing useful pressure drop differentials across the scraping unit are just as worthless from a line-cleaning standpoint as those whose



Booster Station Operating Sequence	
1	Normal Operation Valves A,N,M,B,C,D & F Open Remaining Valves Closed.
2	By-Passing Booster Station Valve F Open Others Closed
3	Receiving Scrapers With Booster Pump Running Valves G,L,N,M,B,C,D & F Open Others Closed.
4	Receiving Scrapers Booster Pump Shut Down Valves G,L,N,M,H & D Open Others Closed
5	Pumping Thru Strainers With Booster Shut Down Valves A,N,M,H & D Open Rest Closed
6	Transmitting Scrapers With Booster Shut Down Valves A,N,M,K & E Open Others Closed
7	Transmitting Scrapers With Booster Pump Running Valves A,N,M,B,C,J,E & F Open Rest Closed

Typical booster station piping plan

stiffness is directly responsible for a rapid rate of rim wear.

The subject of suitable scraping equipment has been treated rather lightly by the gasoline pipe line industry as a whole, and financial expenditures to evolve a type that satisfies the industry's immediate requirements have been authorized more by reason of the observation of individuals who have kept no records of the efficiencies of the various designs under scrutiny and who, in many instances, are incapable of determining just how this efficiency could be obtained, than if the matter were approached from an approved research angle. It is doubtful if any empirical data exists relative to the pressure differential between the head and tail end of scrapers used in gasoline service, and when it is considered how useful this information could be when used as a criterion to calculate the sediment-carrying capacity of the various types, one cannot help but surmise that many hours are wasted running scrapers of designs that produce no tangible benefits. The policy of retrenchment and procrastinative attitude of the industry pursued thus far, where expenditures for research are concerned, has only resulted in an agglomeration of incongruous ideas that defy reconciliation.

To proceed with the mathematical analysis of the section under survey which contains a total sediment load of 29 tons, we must consider the specific gravity of the gasoline in transit as a transporting factor that helps increase the total load each scraper conveys. Figuratively speaking, the total relative weight of the sediment, when

(Continued on Page 156)

SHIPPED: 26,350,000 Bbls. of Oil In Eight Months

THERE'S no denying the fact: Corpus Christi IS one of the major oil ports of the world.

In 1937 the Port's three oil docks handled 31,843,135 barrels of oil. In the first eight months of 1938 . . . with four oil docks in operation, the oil movement has increased approximately 25 per cent, the figures being 26,350,000 barrels.

Corpus Christi is the capital of a prolific oil territory. Within 125 miles are about 8,000 wells, producing 262,000 barrels of oil per day.

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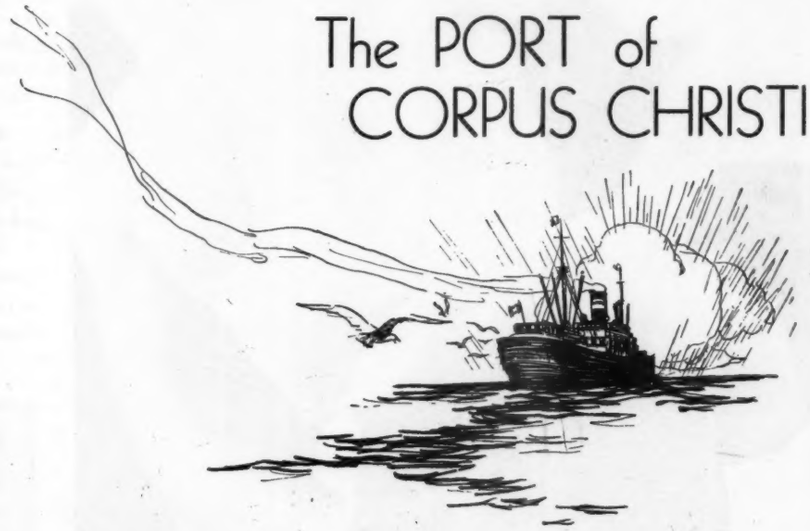

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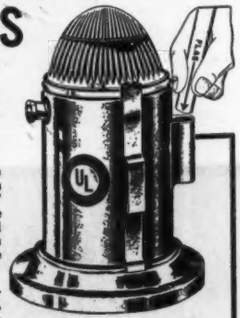

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Construction of Pipe Line From the Barco Concession to Sea

By T. P. SANDERS

In the mountains and jungles of Colombia, South America, one of the most interesting and most difficult pipe line construction jobs in history is in progress. Physical obstacles surrounding the construction work are great, but the significance of the line itself is greater. When completed it will give the famous Barco concession an outlet for its oil, which is now being held underground due to lack of transportation facilities.

On its 265-mile course, the 12-inch line will cross the Andes Mountains, reaching an elevation of more than a mile above sea level. The last 150 miles at the discharge end will pass through low-lying jungles where transportation of equipment is complicated by an almost continuous series of swamps, lakes and streams. During the wet seasons, which usually occur every three months in this section, floods are common. It is one of these periodic floods that is delaying work at the present time. Twenty miles of line have been completed on the high ground northwest of the mountains, but pipe stringing and like activities are being delayed in the low lands. Road building and other necessary work, however, is constantly in progress.

The Barco concession has become famous because of its remote location, its excellent prospects for large-scale development, and the hardships endured by its early explorers and developers. It is an area comprising 1,500 square miles along the Venezuelan border in eastern Colombia, and is owned by Colombian Petroleum Co. In April, 1936, control of this firm passed into the hands of the Texas Corp. and Socony-Vacuum Oil Co., when they jointly purchased 79 per cent of the stock from Gulf Oil Corp., for $12,500,000.

The original concession had been obtained from the Barco heirs by Carib Syndicate in the early twenties. Cities Service was the first American oil company to own controlling interest but this interest was later acquired by the Gulf Oil Corp. Under the stewardship of Gulf most of the early prospecting and wildcatting was carried on.

The concession is not an ordinary leasing agreement. In effect, the terms laid down are part of the laws of Colombia. By virtue of these laws, which regulate the rate of development, Colombian Petroleum Co. is now operating four drilling rigs on the concession and is engaged in selecting 500,000 acres to be retained after the remainder of the block reverts to the government in 1941. Construction of the pipe line is the result of a clause in the agreement which called for such a line on Colombian soil to a Colombian deep-water port when the potential production on the concession reached 3,000 metric tons per day, approximately 22,000 bbls.

South American Gulf Oil Co. is directing construction of the pipe line with John Atwell, chief engineer in charge. Work in progress is being carried on by Engineers, Ltd., a contracting firm headed by A. T. Cassell, president, and A. B. Swinerton, chairman. E. F. Fitzgerald is field superintendent for the contractors. The contract held by Engineers, Ltd., covers a 190-mile section of line from the summit of the Andes northwest to the Caribbean Sea. This leaves a 75-mile section from the Barco concession to the Andes summit which is still to be covered by contract.

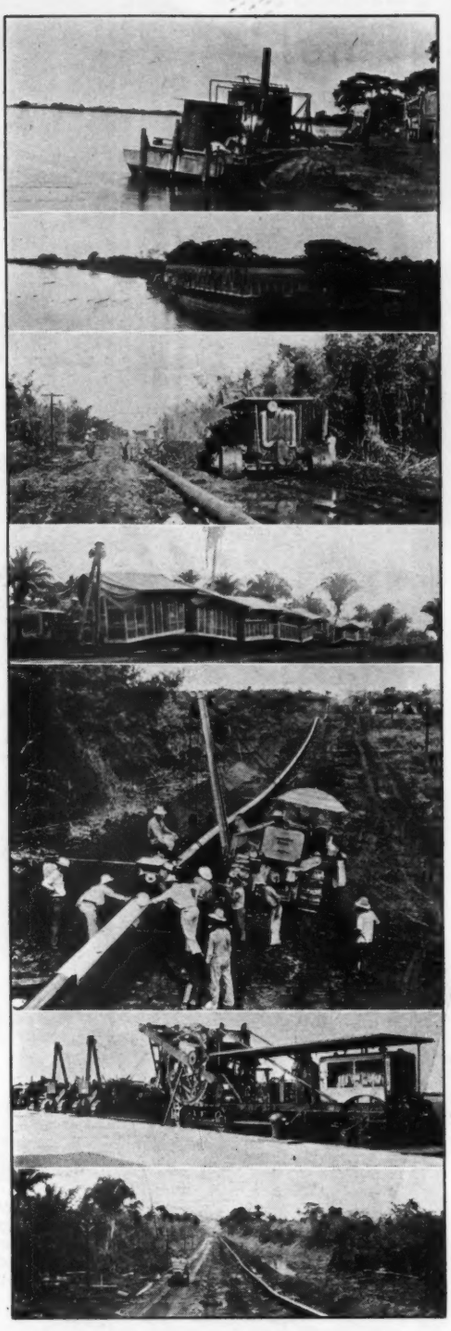
Starting a Petrolea, a production camp on the southern half of the Barco concession very close to the Venezuelan border, the course of the line takes the shortest possible route up the southeastern slopes of the Andes to Paso de Bobali. Highest elevation on the mountain pass is 5,400 feet, which is reached in a distance of 65 miles after leaving the near sea level concession. Three large booster stations will be constructed to pump the oil up the mountain slopes. The entire line will be made of 12-inch pipe.

Near the summit of the Andes the course of the line passes through Convencion, a native village, and it is here that the section covered by the contract with Engineers, Ltd., begins. From this point the course lies down the steep northwest slopes of the mountains and into the Magdalena River Valley. After crossing the river, the line will pass through Ritero. Much of this part of the course is roughly parallel to the Magdalena River. From Ritero the line runs across rolling country to Covenas on the Caribbean Sea where the loading terminal will be constructed. The gravity flow down the western Andean slope is broken by tanks inserted into the line to relieve the excessive head induced by a 5,000-foot drop.

While several distinctly different types of country are crossed, exceptionally difficult construction conditions prevail throughout most of the course. The mountainous terrain in the Andes is covered by dense jungle growth, and there are no roads. Building of roads for moving in equipment is a formidable task in this section, and present plans call for delivering all equipment for one of the pump stations to the location by airplane. This station, which is to be situated high on the southeastern slopes at Terra, has been designed with this in mind. It is reported that some of the pipe adjacent to this location may also be delivered in short lengths by planes.

In the Magdalena River Valley a line was completed in 1925 by Andean National Corp. to transport oil from the El Centro area of Colombia to a tanker terminal 10 miles southwest of Carthegena on the Caribbean Sea. Throughout its 537 kilometers of length (333 miles) this line follows the course of the Magdalena River. Difficulties encountered in its construction show the magnitude of the task undertaken by the constructors of the Gulf line. Significant is the fact that 60 per cent of the Andean National Corp.'s line is under water. The river follows no definite channel but adopts itself to an ever-changing course through the flat marshy valley.

Construction of air terminals is in progress at



From top to bottom: Water treating plant on Magdalena River, modern camp mounted on barges, ditching machine creeping through mud, mobile camp for crews of Engineer, Ltd., laying cross-country section of the line, wrapping asbestos about the line to prevent soil corrosion, ditching machine and equipment being unloaded on the Magdalena River, and a section of the Gulf Oil Co. line on higher ground west of the Andes Mountains showing road and telegraph lines.

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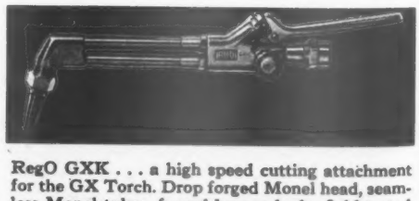
The "hard-to-get-at" spots vanish when welders operate the RegO GX Welding Torch. Compact construction, perfect balance, lighter yet stronger alloys permit welders to handle the GX torch as easily as the welding rod — even when working in close, cramped quarters, as shown above.

The GXK Cutting Attachment, shown in operation, instantly converts the GX welding torch into an efficient cutting tool. The evident savings in time and investment are soon realized when the GXK attachment is put to work on pipe line cutting operations.

RegO GX . . . the Universal welding torch with every major feature. Solid handle, forged valve body, stainless steel head, individual tip mixers, hard drawn copper gooseneck and tip ends which are streamlined and mirror burnished inside.

The balanced two-stage RegOlator maintains a constant flow of gas. Sensitive adjustability, complete safety and economy are features that assure perfect welds. A patented filter removes all rust, dust and dirt from the incoming gas.



RegO GXK . . . a high speed cutting attachment for the GX Torch. Drop forged Monel head, seamless Monel tubes, forged bronze body, field-tested high pressure valve and tips for every cutting job . . . mean speed and economy with the RegO GXK.

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five points on the course of the line. These are at Covenas, Ritero, Ayacucho, Terra and Petrolea. They will be used during both construction and operation of the line. Communication on the line will be afforded by both a telegraph and a radio system.

Plans are not complete for the construction of the loading terminal at Covenas. Wharfs are present at this location which were constructed in conjunction with a packing plant. The packing plant is no longer in operation, and since the wharfs have been purchased by the Gulf company, it is probable they will form the basis of the terminal. Since deep water is available, it will not be necessary to use the submarine loading type of terminal.

Work on the line is accompanied by a continuous battle against the mosquito-infested jungle. However, careful planning and excellent equipment have reduced the natural dangers and discomforts to the minimum. The crews live in two portable camps which are modern in every respect. One camp is built on trailers and is moved a few miles at a time to accompany the crews as they progress in the cross-country laying of line. The other camp is identical in its facilities, but it is built on barges, and accompanies the crews working along the Magdalena River and larger tributaries.

Camp Facilities

Each camp consists of sleeping quarters for 56 men, shower rooms, kitchen, two dining rooms, hospital ward, office, machine shop, refrigerating compartment, and power plant. Two water treating plants are operated on the river or on streams. Each of these treats 5,000 gallons of water in eight hours' time through a process of settling, boiling for five minutes under pressure at 250° F., chlorinating and cooling. The treated water is taken to the camps in tank trailers where a pressure system is used for distribution.

An extensive system has been developed to insure an uninterrupted supply of fresh foods. A slaughtering and refrigerating plant has been established by the contractor at Ritero, and each camp has its own refrigerating system for keeping perishables. It has been reported that the best meals in Colombia are served in these moving camps.

The power plants, which accompany both the mobile camp and the barge camp, furnish electricity for the refrigerating plants, and camp lighting systems. All buildings are thoroughly screened to prevent entrance of insects. The presence of wild tribes in the jungles, especially in the vicinity of the Barco concession, make vigilance advisable. Camps are floodlighted at night, and watchmen are kept on duty.

Completion of the Gulf line is expected early in 1939, but since one section still remains to be contracted, no definite completion date has been set. After completion, the normal capacity will be approximately 75,000 bbls. per day, but the throughput will be lower until the productivity of the Barco concession reaches this potential. The oil to be carried ranges in A.P.I. gravity from 40 to 48 degrees. This exceptionally good oil is found on the North Petrolea dome of the concession at depths from 600 to 1,300 feet.

The condition of the soil through which the line passes suggests the possibility of rapid corrosion. In order to avoid troubles due to this cause, the entire line is to be wrapped with asbestos and kraft paper.

It is unlikely that any other territory offers as many natural obstacles to development of oil as does Colombia. Transporting of oil from the Barco concession would be relatively simple if it could be piped across Venezuela to Lake Maricaibo, or if it could be barged down the Magdalena River. However, it cannot be shipped from foreign ports, and the many sand bars, and low water in dry seasons on the Magdalena made the adopted method necessary.

O-K Pipe Cleaning Machines and Pipe Straighteners

Designed and built by a pioneer machine manufacturing organization which has served the great oil industry of the Mid-Continent field for nearly 30 years, O-K Pipe Cleaning and Pipe Straightening Machines meet every requirement for speed, endurance and economical operation. Scores of leading oil companies, pipe line companies and pipe yards have had years of satisfactory service out of O-K equipment.

O-K Hydraulic Pipe Straighteners

SPECIFICATIONS:

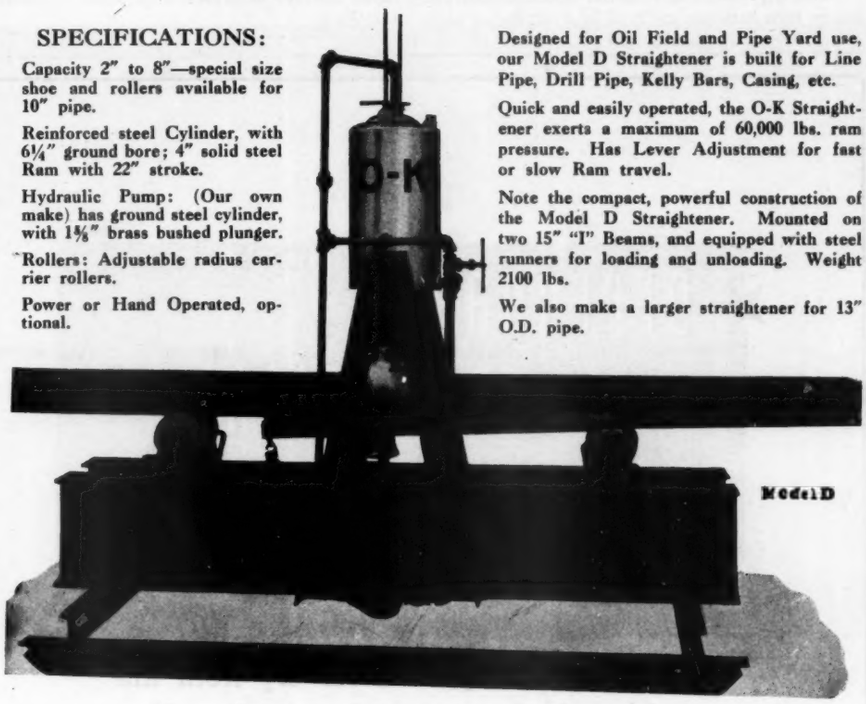
Capacity 2″ to 8″—special size shoe and rollers available for 10″ pipe.

Reinforced steel Cylinder, with 6¼″ ground bore; 4″ solid steel Ram with 22″ stroke.

Hydraulic Pump: (Our own make) has ground steel cylinder, with 1⅝″ brass bushed plunger.

Rollers: Adjustable radius carrier rollers.

Power or Hand Operated, optional.



Designed for Oil Field and Pipe Yard use, our Model D Straightener is built for Line Pipe, Drill Pipe, Kelly Bars, Casing, etc.

Quick and easily operated, the O-K Straightener exerts a maximum of 60,000 lbs. ram pressure. Has Lever Adjustment for fast or slow Ram travel.

Note the compact, powerful construction of the Model D Straightener. Mounted on two 15″ "I" Beams, and equipped with steel runners for loading and unloading. Weight 2100 lbs.

We also make a larger straightener for 13″ O.D. pipe.

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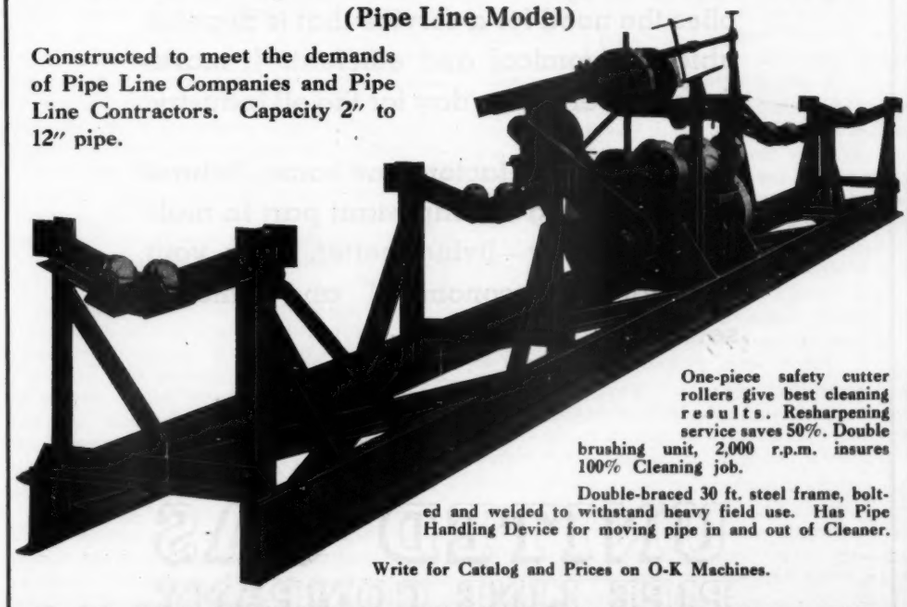
Constructed to meet the demands of Pipe Line Companies and Pipe Line Contractors. Capacity 2″ to 12″ pipe.



One-piece safety cutter rollers give best cleaning results. Resharpening service saves 50%. Double brushing unit, 2,000 r.p.m. insures 100% Cleaning job.

Double-braced 30 ft. steel frame, bolted and welded to withstand heavy field use. Has Pipe Handling Device for moving pipe in and out of Cleaner.

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O-K MACHINE & MANUFACTURING CO.
417-21 EAST FIRST ST. TULSA, OKLA., U.S.A.

SCRAPERS

(Continued from Page 151)

compensation has been made for the buoyancy effect of the gasoline, is

$$29\times(1.3-.74)=16.2 \text{ tons (approx.)}$$

Assuming that eight 8-inch scrapers are started from point "A" at intervals of 30 minutes when the stream velocity approximates 4 miles per hour, we find that the pipe line distance between consecutive scrapers is 2 miles and the relative weight of sediment in that 2 miles is,

$$\frac{16.2\times2}{25}=1.3 \text{ tons (2,600 lbs.)}$$

With a pressure differential of 10 pounds per square inch between the head and tail end of each scraper and an efficiency of 90 per cent, the calculated sediment carrying capacity in pounds is

$$8^2\times.7854\times10\times.09=452 \text{ lbs.}$$

which is only 17.4 per cent of the sediment load in the section between successive scrapers. The pipe line grade is ignored in this discussion because even at its steepest between mile 4.66 and mile 11.74 it is only .94 per cent. The total mileage that the eight scrapers, incorporating the pressure drops, efficiencies and loading capacities listed, are capable of cleaning

$$\frac{452\times8}{2{,}600}=1.39 \text{ miles (approx.)}$$

It is therefore logical to conclude that the minimum number of scrapers required to clean this section is

$$\frac{25\times8}{1.39}=144$$

When a scraper is loaded to its maximum capacity it is obvious that any additional load will automatically be compensated for when the scraping discs blend to disgorge sediment equal to the weight of the overload. Purging of this kind often takes place in line sags, particularly when the pipe line grade traverses a steep upward gradient. Finished product lines often use the line's "C" value or roughness factor as a measuring stick to determine the pipe's frictional resistance to flow. The advantage claimed for using this dimensionless number is, with all other conditions remaining constant, that a change in throughput capacity reflects a similar change in the value of "C" when such change is calculated as a percentage of the initial. For example, a 5 per cent increase in "C" will reflect as a 5 per cent increase in capacity.

Numerous systems have been established to depict mathematically or graphically, the efficiency of line sections. Some of these take cognizance only of the "C" value while others are more elaborately coordinated to provide definite percentage results when compared to a datum representing the calculated maximum for each section. This latter method requires considerable time, and because of continuous changes in the specific gravity of the liquid, is not absolutely accurate. Observations sufficient to satisfy the operating departments of most gasoline lines take into consideration only the throughput capacity, line pressures and liquid specific gravity when determining the line efficiencies, and the results of such observations are compared with the theoretical calculations pertinent to capacities and pressures. This system has proved quite satisfactory and decreased capacities caused by sediment obstruction are quickly detected from the tabulations that are listed daily.

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● Drilling, today, is a far cry from the crude methods employed yesterday. Natural Gas has entered the picture. It supplies the need for a service that is dependable, economical and efficient. It marks the dawn of a new day for the oil industry.

● Into industry, factory and home, Natural Gas is playing an important part in making life easier—living better. It is your dependable, economical and efficient servant.

UNITED GAS
PIPE LINE COMPANY

PIPE LINE METERING

(Continued from Page 90)

addition to handling the trunk line stream. The specific problem was laying approximately 2,000 feet of 16-inch suction line and the building of a 55,000- or 80,000-bbl. tank, at an estimated expense of $25,000 or $30,000. In view of the modern trend toward the simplification of facilities, it was decided to avoid as much of this expense as possible and make a trial installation of a positive displacement type meter for checking the 40,000-bbl. receipts in 24 hours, and use the present facilities at the station, consisting of two 55,000-bbl. tanks and 10-inch suction lines, to the best advantage. The plan has worked out well enough to warrant an explanation of the piping system and the method of operation.

First, your attention is invited to Figure 4, showing the relationship of the meter to the crude oil piping system, the tanks, the pressure regulating valve and the pumping equipment at the trunk line station. After the field oil is checked through the meter, it passes directly to the suction line between the 55,000-bbl. tanks and the discharge pumps, and thence to the suction side of the discharge pumps without going to the tanks. A pressure regulating valve installed on a by-pass of the tank line permits only the surplus oil (over the amount being discharged from the station) going to the tanks. The function of the combination check and pressure regulating valve, developed by the company, is to hold a back-pressure on the suction piping system and at the same time allow oil to flow from the working tanks into the suction system of the discharge pumps if the suction pressure drops below a normal figure for scheduled operations. A further function of the regulating valve is to carry a back-pressure on the delivery side of the meter to prevent the crude oil vaporizing. The pressure on the suction system is used

also for proper filling of the discharge pumps. In this particular case, the regulating valve is set for a pressure of 6 to 12 pounds. The field oil, delivered directly to the suction manifold piping system, with the trunk line receipts from the preceding trunk line station combines to supply the discharge pumps with oil. A low pressure recording gauge is installed on the instrument board in the station building to show the variations in the suction pressures throughout the 24-hour period of operation. A warning signal in connection with the low pressure gauge, is used to show when the suction pressure has dropped below normal for the established operating rates of the field, as well as the trunk line streams. In order to equalize the amount of trunk line and field oil received, the company developed and patented an attachment for regulating the speed of one or more of the Diesel engines by the pressure on the suction system of the crude oil discharge pumps. In this manner, the variations in the operations of either the preceding trunk line station or the field gathering station, causing a variation in the crude oil receipts, can be compensated for by increasing or decreasing the speed of one or more of the pumping units. Through this arrangement only a small quantity of oil will pass through the regulating valve into the storage tank at the receiving trunk line station. It is estimated the expenditure for this meter installation not only saved a minimum of $20,000 in a new investment but will also pay for its own investment in two years by the saving in evaporation losses. This installation demonstrated that the meter will be used to good advantage for:

(a) Conservation of petroleum through the saving of evaporation losses occurring in checking crude oil receipts in and out of tanks.

(b) The simplification of operations.

(c) Lower investments in facilities in the future for checking field receipts at trunk line stations.

(d) Simplification of the present facilities at trunk line stations for receiving and checking field receipts.

Piston type meters show good accuracy under ideal conditions.

For the two 6-inch meters in the installations described above, the inaccuracies, plus or minus obtained by checking the meters against gauges in 55,000-bbl. tanks, have been in the range of plus or minus one-tenth of 1 per cent for an average receipt of approximately 35,000 bbls. of oil daily over a period of six months.

For a similar installation used for checking deliveries to a refinery, the inaccuracy for 10 deliveries of approximately 39,000 bbls. each, over a period of five months, has been the difference between 390,311 as measured by the meter and 390,244, as gauged in 55,000-bbl. tanks. These figures show that the meter was 67 bbls. over on the total delivery. For the individual deliveries, the inaccuracy varied from .2 per cent to .6 per cent, plus or minus. The error for the total delivery was .017 per cent, which is indicative of compensating errors for the individual deliveries. The temperature of the oil in the tanks was one to three degrees higher than the oil passing through the meter. A correction for this difference of temperature was made for only one of the 10 deliveries referred to above.

It must not be assumed from this information that similar results can be obtained by just installing a meter. The principal reason for the good results and the accuracies is found in the use of the necessary auxiliary equipment to control the factors, which will cause errors in the meter's operations. Even in this location, where the oil is comparatively free of foreign substances and where crude with a low vapor pressure is being measured and the viscosity and oil receipts will not vary much, it has been necessary to provide all this auxiliary equipment, such as an air eliminator, strainer, proving tank, relief valve, et cetera, to obtain accurate results. The author wishes to emphasize that the accuracies of these meters will depend to a large degree upon providing necessary auxiliary equipment, the calibration of the meter on a regular schedule, constant vigilance, careful supervision, and frequent inspections.

Metering of crude oil at lease tank connections is not practicable.

There is an opinion among some people who are not acquainted with the practical operations of the pipe line industry that meters can be used in conjunction with the producers' lease tanks for purchasing oil run out of these tanks by the pipe line companies. There is a vague idea that meters might be used for running the oil directly from the producing wells to the pipe lines, without the use of the producers' tanks. It is the opinion of most pipe line engineers that meters cannot be substituted for gauging procedures used in purchasing oil in the producers' lease tanks. They believe also that in the present stage of development, meters will not function satisfactorily on pipe lines at least tank connections. Their reasons are:

(a) A certain amount of pressure head is required to overcome the friction of the meter. It remains to be demonstrated in practice that the friction across the meter, strainers and other auxiliary equipment will not be large enough to cause the oil to flow from the producers' tanks into the pipe line at a slow rate and to prevent an appreciable percentage of the gauged oil leaving the tanks. The consequences would be a greater investment for the producers in tankage, an account of dead space and the slow rate at which the oil would flow into the pipe line by gravitation, and for the same reason, a greater gauging cost to the pipe line company.

(b) A large investment in auxiliary equipment would be required for controlling the variable factors and keeping the meters in calibration. The necessary investment for the meter and the auxiliary equipment could not be justified for many leases.

(c) Even under ideal conditions, the meters must have careful supervision and must be calibrated for accuracy on a regular schedule. It is doubtful whether the proper supervision could be given to meters installed at each battery of lease tanks. It is believed that as many men as the number of gaugers used to run the oil would be required to read, inspect, maintain, calibrate and supervise the meters. In that case, it would be better and more economical to use the present practices and an observer could make joint gauges and inspections with the gaugers when such information is required. The meters cannot eliminate any of the necessary inspections. Its only possible use would be the measuring of the volume, which is the simplest part of the gauging procedure.

(d) It is believed that constant trouble would be experienced with the meters on account of accumulations of sand, paraffin and emulsions, wear in the meter due to erosion and corrosion, as well as the meters becoming inoperative from the freezing of the closely fitted parts of the meters by particles of water when the meter is idle.

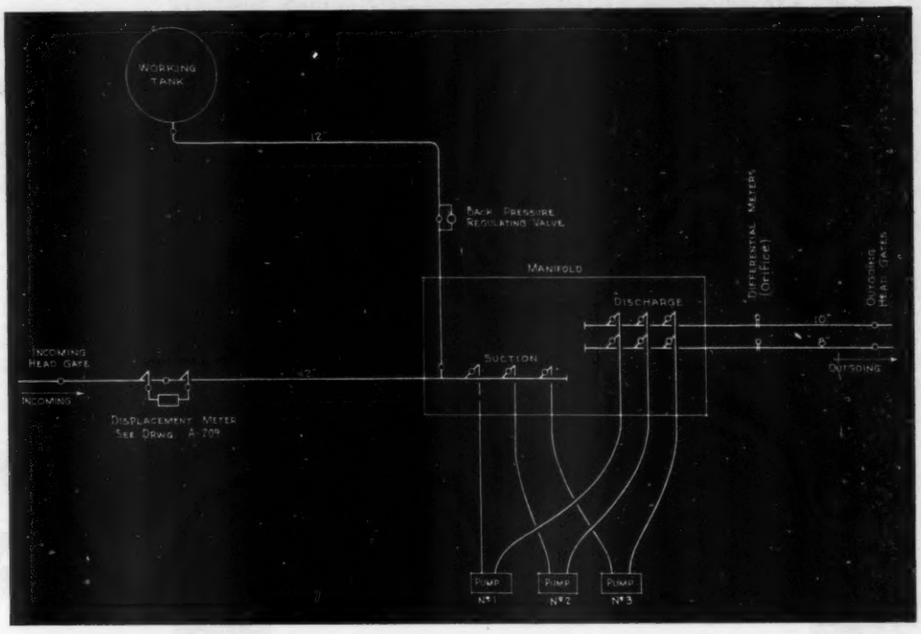

Fig. 4—Diagramatic sketch showing how the meter can be used to good advantage in planning for the simplification of facilities

(e) These meters will also measure air, when the level of the oil in the lease tanks has reached the tank connection. A shut-off valve on tank connections will be recommended as a remedy, however, these type valves have not been developed to be "foolproof." The meters will measure a certain amount of air, if they are installed on pipe lines between lease tanks and field gathering stations.

(f) Serious controversies might develop between the pipe line companies and the producers, an account of inaccuracies in the meters.

(g) Oil in the gathering system could back up through certain types of meters into the producers' lease tanks, so that the meter readings would probably not check against the gaugers' run tickets.

(h) By experience the pipe line companies have learned that the displacement type meters do not function satisfactorily on suction or gravity lines. This experience would also apply to the use of meters installed on pipe lines near lease tanks, which in reality are suction lines.

(i) Meters cannot be made "foolproof" against tampering and their use would not provide against loss by theft of oil, when unscrupulous persons wish to carry out such a purpose.

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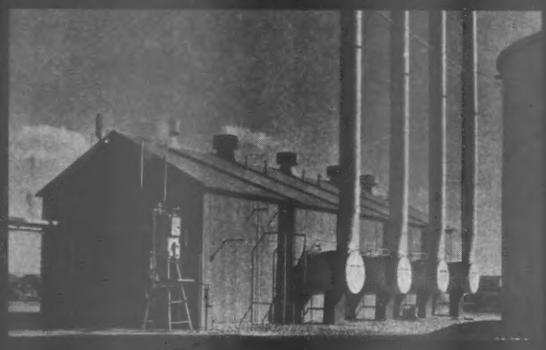

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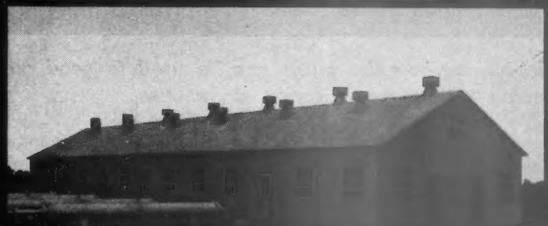

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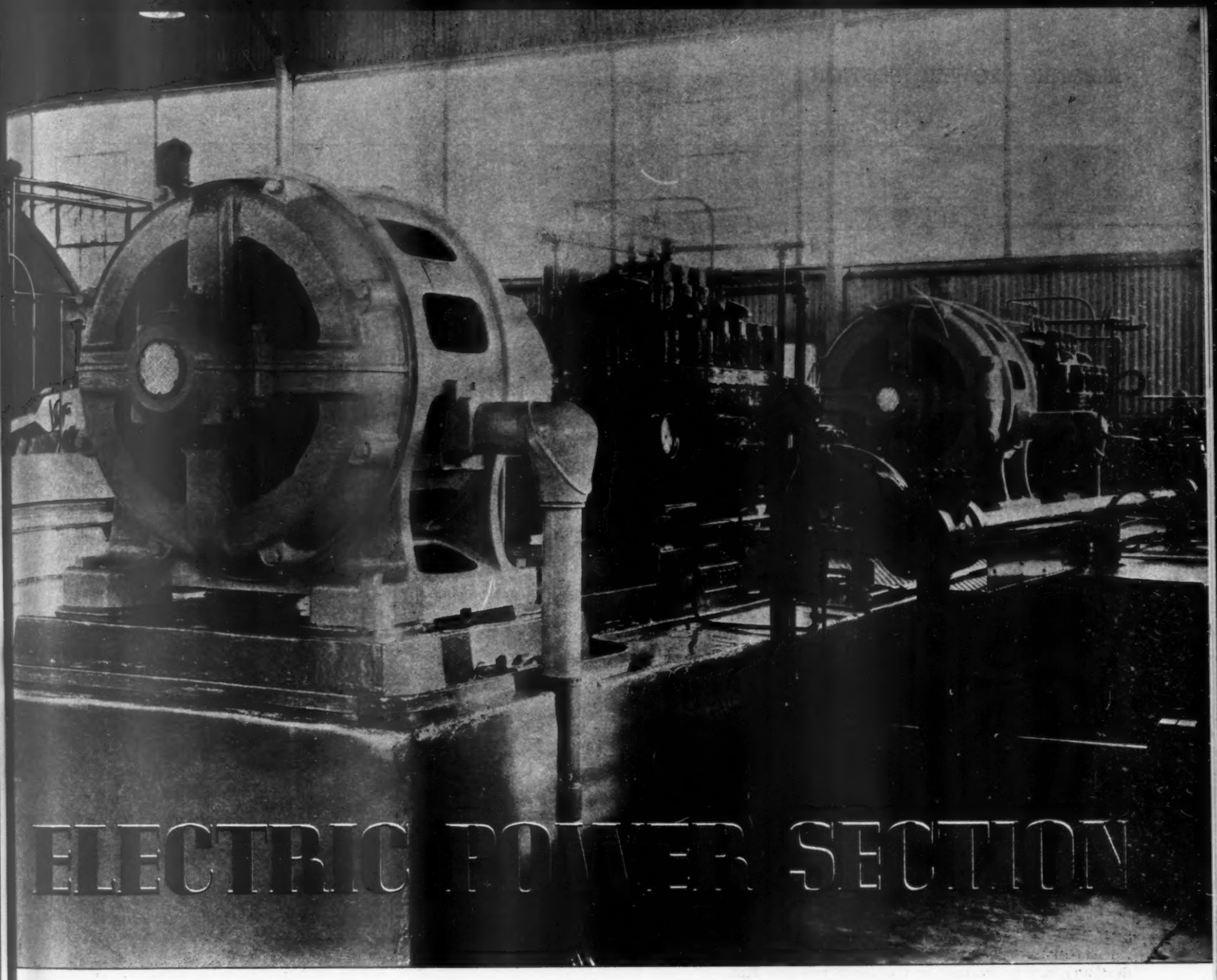


ELECTRIC POWER SECTION

Electric Motors and Their Control

By M. A. HYDE
Petroleum Industry Engineer
Westinghouse Electric & Manufacturing Co.

The earliest installation of pumps operating on petroleum pipe lines and compressors operating on gas transportation lines were of the reciprocating type. Many highly satisfactory motor drives have been installed on such units, operating through speed reduction equipment, or using direct drive by slow speed synchronous motors. When some years ago centrifugal pumps were developed having characteristics capable for handling oil and petroleum products at the pressures required in pipe line practice, it was immediately appreciated that such a high speed unit is ideally suited to direct drive by the electric motor. The combination of high speed driving and driven units results in small physical size, minimizing the investment in not only the equipment itself but also in the necessary foundations and buildings.

Compared with other types of motor power, electric drive has additional advantages in relative freedom from associated primary or auxiliary equipment, such as boilers, water supply, water treating system, water cooling system and the like, all of which reflect in capital cost as well as in operating and maintenance expense. Since electric power transmission lines can be run over all types of terrain, motor driven centrifugal units allow the most advantageous location of stations, due to portability, and independence of established transportation facilities and water supply.

Another important advantage of electric drive is the ease with which the installation can be operated. In some cases full advantage has been taken of the ease of control afforded by electric drive, to the extent of making such stations partially or totally unattended and controlling them remotely.

In the case of a pipe line subject to operation for considerable periods at capacities below the maximum for which the line was built, as may occur through decline in production of an area served by a branch line, or by changing of demands in the case of a trunk line, the low initial cost of electric drive is particularly advantageous.

If it is likely that the line will operate at a substantially constant volume for a number of years, units may be chosen to give the most efficient performance at the desired capacity, and for this service single-speed alternating-current motors are the most satisfactory. Such motors may be of the squirrel cage or synchronous type. The squirrel cage motor is the least costly of all types and being the simplest is the most reliable. Where direct driven high speed pumps are installed the squirrel cage motor has usually sufficiently high power factor that the additional expense of synchronous motors is likely unwarranted. Where explosion-proof equipment is required the squirrel cage motor being the simplest form is the most adaptable to explosion-proof construction.

Where operation at varying loads is anticipated, this can be provided for either by the installation of units capable of operation at variable capacity or by the installation of a number of units capable of operation in different combinations. There is no general solution to the problem of varying the capacity of a pipe line be-

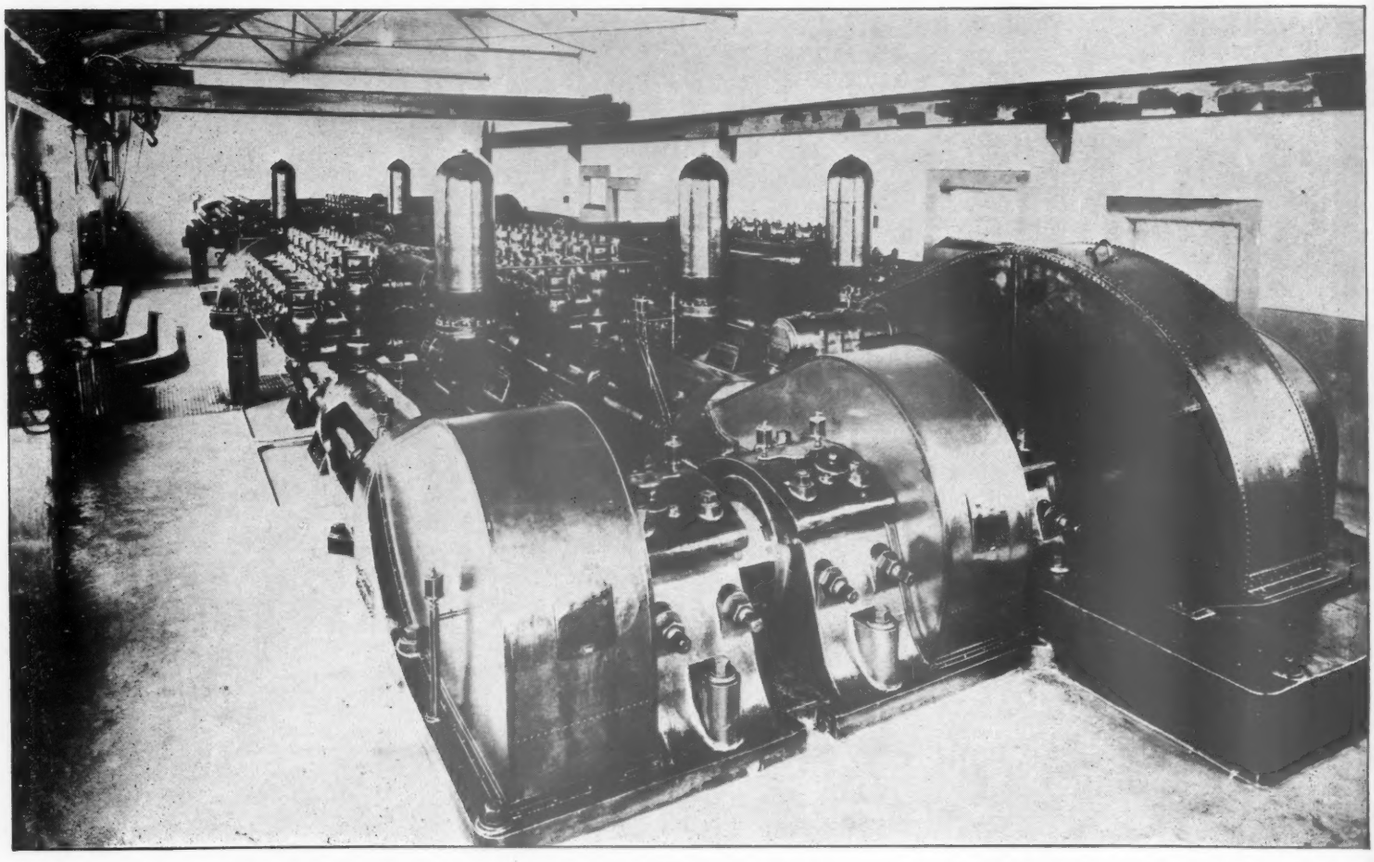


Fig. 1—Two 7-inch by 36-inch triplex horizontal pumps driven by 600 hp., 435 r.p.m., squirrel cage induction motors located beyond wall

cause each line has its own conditions of operation upon which the particular answer for that line depends.

If a single constant speed unit does not provide sufficient flexibility, an acceptable degree of flexibility may be attained by the use of two or more units operating between points where relatively large storage capacity is available, by selecting the number of units operated to conform as nearly as possible with the existing load, and making up the difference in load by use of storage.

Stations without storage may be designed with a number of constant speed units operating either in multiple or in tandem to meet the variations in capacity imposed on the line.

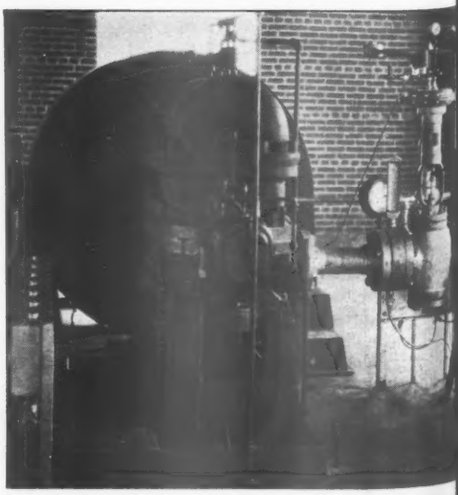
A line equipped with centrifugal pumps driven by constant speed motors may be operated at reduced capacity by shutdown and by-passing of individual stations at intervals along the line, or of individual units. With such arrangement the pressure is developed by the units in operation are additive and build up to offset the pressure drop produced by the flow of the discharged volume through the existing length of discharge line.

If combinations of single speed units such as outlined above do not provide the required degrees of flexibility, two-speed squirrel cage motors may be used. Motors of this type are fairly efficient on either speed connection, have the advantage of simple mechanical construction, and employ relatively simple control.

Where the requirements exceed the possibilities of the fixed speed and multi-speed combinations discussed above, variable speed electric drives of several types are available, but in general these have the disadvantages of higher first cost, greater complication with corresponding maintenance, and in some cases lower efficiency. The wound rotor induction motor is the most common variable speed A.C. drive. This motor employs resistance connected into the secondary winding to accomplish the speed variation. When operated at full speed it has very high efficiency, but at reduced speeds the efficiency is lowered due to power losses in the controlling resistor. This power loss is proportionate to the product of the torque and the speed reduction accomplished by insertion of the resistance. A point sometimes overlooked is that as the speed of a centrifugal pump is reduced the torque imposed on the driving motor diminishes more rapidly than the speed is reduced. This results in lower resistance loss than would occur if the torque remained constant. Wound rotor motors can be

Fig. 2—Three 200-hp., 3,550 r.p.m., totally enclosed, fan-cooled motors coupled to centrifugal pumps on a California pipe line

Fig. 3—Six-stage centrifugal pump on gasoline pipe line driven by 350-hp., 3,550 r.p.m., 2,300-volt, totally enclosed, fan-cooled, explosion-resisting motor



built in two-speed construction, having the advantage of operating at half speed efficiently. but such construction is relatively costly and the control relatively complicated. Where explosion-proof construction is a factor, wound rotor motors are at a disadvantage in that they are somewhat more costly to build in this form than the squirrel cage induction motor, due to the presence of collector and brush riggings.

Commutating A.C. motors using brush shifting for speed control, give better efficiency at reduced speeds than the wound rotor motor. However, this motor is limited to relatively low speed applications and involves extensive brush rigging that is not readily adaptable to explosion resisting construction.

Direct current motors operating from variable voltage produced by engine or motor driven generators, or rectifiers, have excellent operating characteristics for variable speed pumping service, but are also subject to the disadvantages of high initial cost, limitation to relatively low speed, and difficulty of building in explosion proof construction.

In the preceding discussion, considerable emphasis has been placed on the adaptability of the various types of motor to explosion-proof construction. This reflects a present trend toward explosion-proof equipment. In many instances

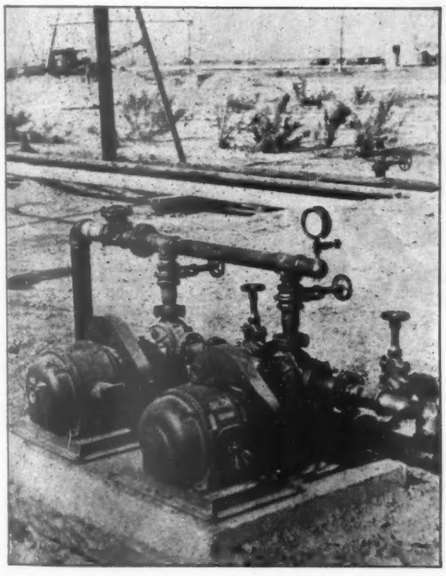


Fig. 5—Splash-proof motors, 15-hp., driving gathering pump

outdoor installations are made, sometimes with the motors and pumps mounted outdoors and the control indoors.

Forms of Motor Construction

Motors are available in open, splash-proof, explosion-resisting, gas filled, and pipe-ventilated constructions, the selection depending upon whether the unit is to be mounted indoors or out, and the extent to which hazardous atmospheres may exist at the location.

Open motors are of course the lowest in first cost, and many installations of the type have been in successful operation for a long time. On lines handling volatile grades of products open motors are generally avoided or if used are separated from the driven pump by a fire wall as shown in Figure 1, usually with a stuffing box in the wall through which the driving shaft passes.

Figure 2 shows an installation of three 200-hp. totally enclosed fan cooled motors driving 3,600 r.p.m. centrifugal pumps on a California pipe line. In this case the motors and pumps are mounted outdoors and the control, which consists of simple magnetic full voltage starters, is located in a small building nearby.

Figure 3 is recent installation typical of several 350-hp. and 500-hp., totally enclosed fan cooled explosion resisting squirrel cage motors on a mid-western gasoline pipe line. The unit shown is a 350-hp., 3,565 r.p.m., 2,300-volt motor driving a six-stage centrifugal pump. In this case explosion-proof construction is used due to location of the motor indoors, and permits elimination of any fire wall between motor and pump.

An installation of synchronous motors with explosion-proof collector housings is shown in Figure 4, consisting of three 800-hp. motors direct connected to centrifugal pumps discharging at about 750 pounds when two units are operating

(Continued on Page 175)

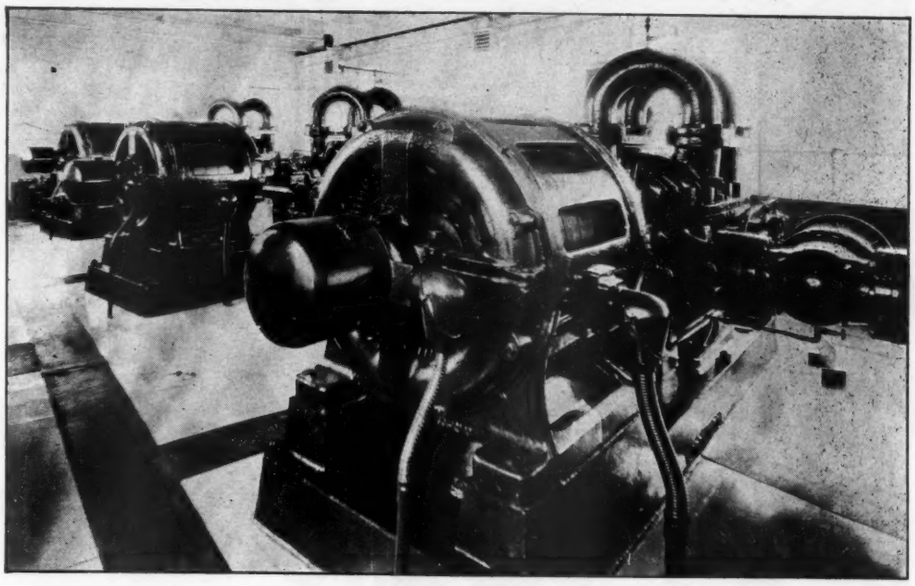


Fig. 4—Three 800-hp., synchronous motors with explosion-proof collector housings driving booster pumps on a 12-inch trunk oil line

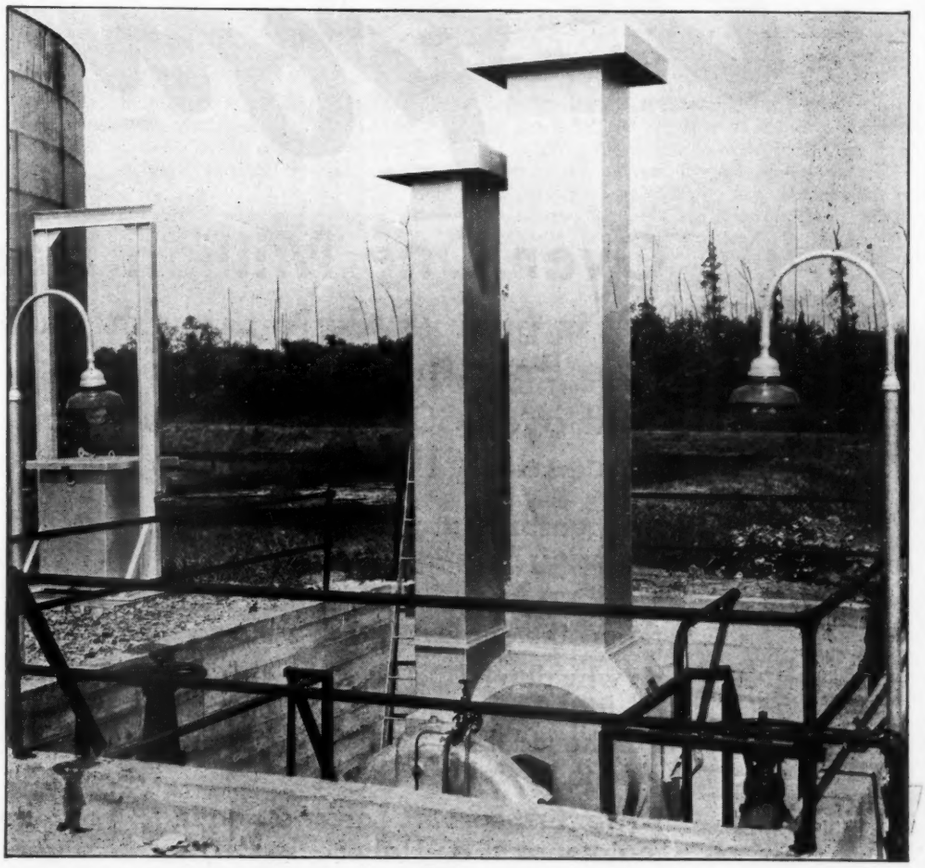


Fig. 6—An outdoor installation of gasoline cargo loading pump driven by 500-hp. pipe ventilated motor. Ducts are carried to sufficient elevation to provide safe ventilating air

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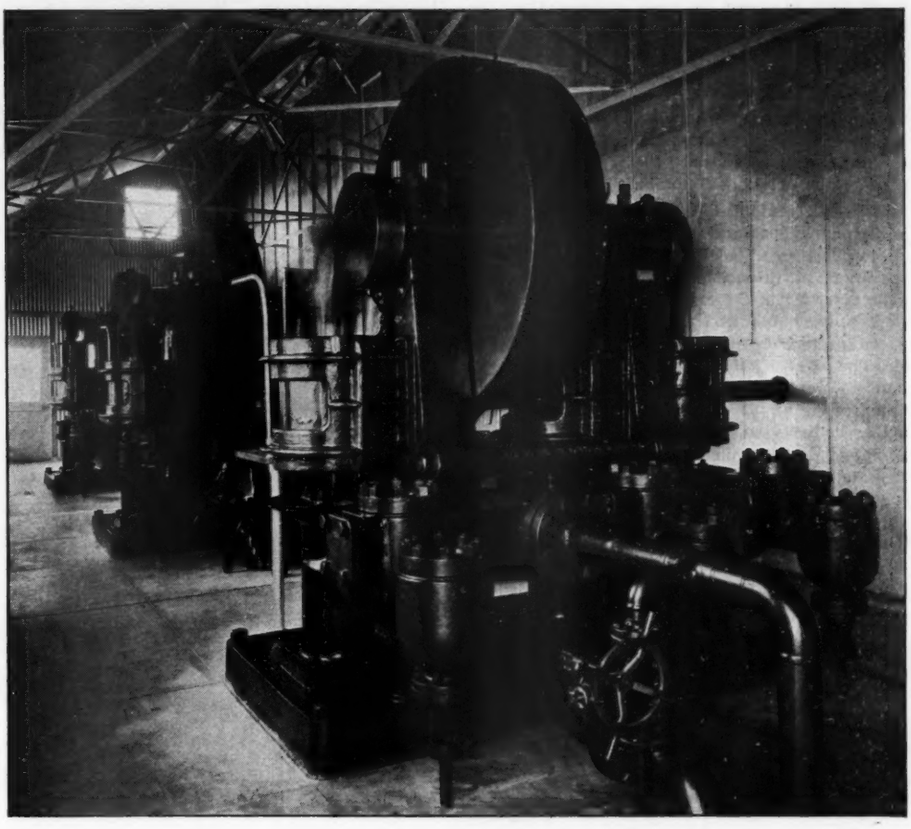
PROFIT BY USING ELECTRIC POWER

New Gulf Coast Station Uses Electrical Power

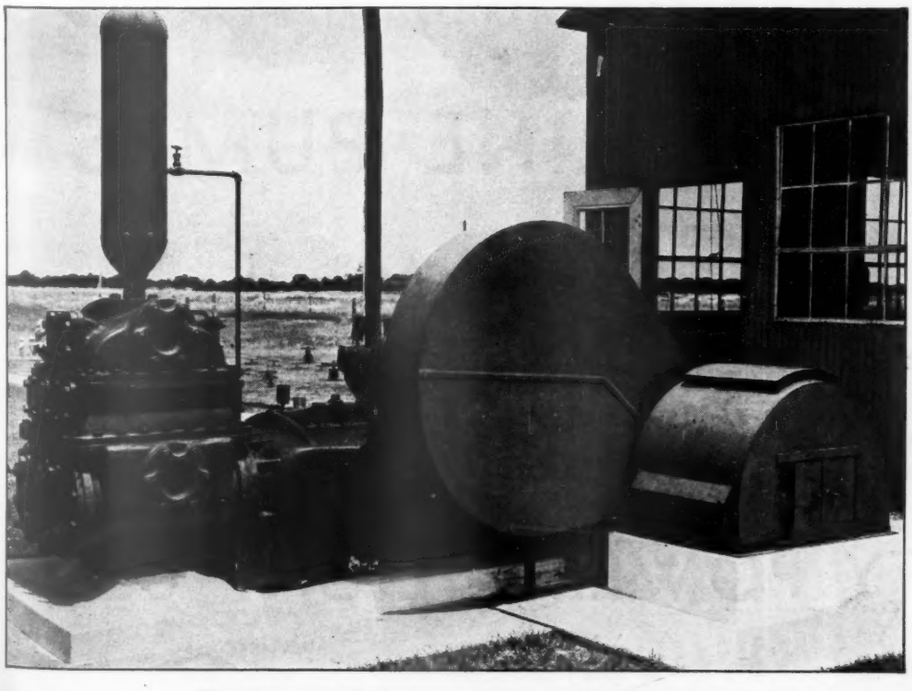
By K. K. KREAMER
Houston Lighting & Power Co.



Pump room in Pan American pipe line station at Alvin

An example of a well-planned and efficiently operated electric powered pipe line station is the new Alvin station of the Pan American Pipe Line Co., located in the Hastings oil field near Houston, Tex. Construction of this station was begun in the fall of 1936, placed in operation early in 1937, and has since been increased in capacity.

The station building is of galvanized corrugated iron and is divided into two parts, motor room and pump room, by a sheet steel firewall. The pinion shafts of the pumps extend through the firewall into the motor room and are connected to the motors by V-belt transmission. The discharge pumps are reciprocating type, vertical triplex. Oil is gathered from the lease tanks throughout the field by means of a suction system and delivered to storage adjacent to the station. The suction pumps are horizontal reciprocating units. In the earlier days of the field one suction unit, located inside the station building, was sufficient but since that time a second unit has been added—a completely weatherproof installation located out of doors near one end of the station building. The suction pumps are powered with 15-hp. motors and, it is reported, that there are few fields in the country where as great a volume of oil is gathered to one point from such a distance and using such a small amount of power. There are four discharge units, three of which are of like capacity and another of slightly smaller size. The main pump motors, one 100-hp. and three 125-hp., are standard squirrel cage type, 2,300-volt, 900 r.p.m. operated through reduced voltage compensators.



Weather-proofed electric motor on outside pump

General Design

From the standpoint of both operation and good engineering practice, the station wiring system and motor room layout are of excellent design. Utility power service is delivered at the substation in the station yard within a short distance of the building. The three-phase, 2,300-volt service is brought underground in conduit to a main circuit breaker in the motor room and from that point is carried to the individual motor circuit breakers. The motor circuit breaker and starting compensator are mounted together as a unit and located so that the operator has a close view of the motor when handling the controls. Single-phase lighting lines, as well as three-phase, 440-volt service for the suction pumps, are also brought underground from the substation to the motor room. Connected to the 2,300-volt buses in the substation are four outdoor capacitor units for power factor improvement. Each unit is of correct capacity for one motor and may be cut in or out of service as needed. Thus the flexibility of the layout is shown in that a wide range of station performance is possible and at the same time high efficiency of the electrical equipment is maintained.

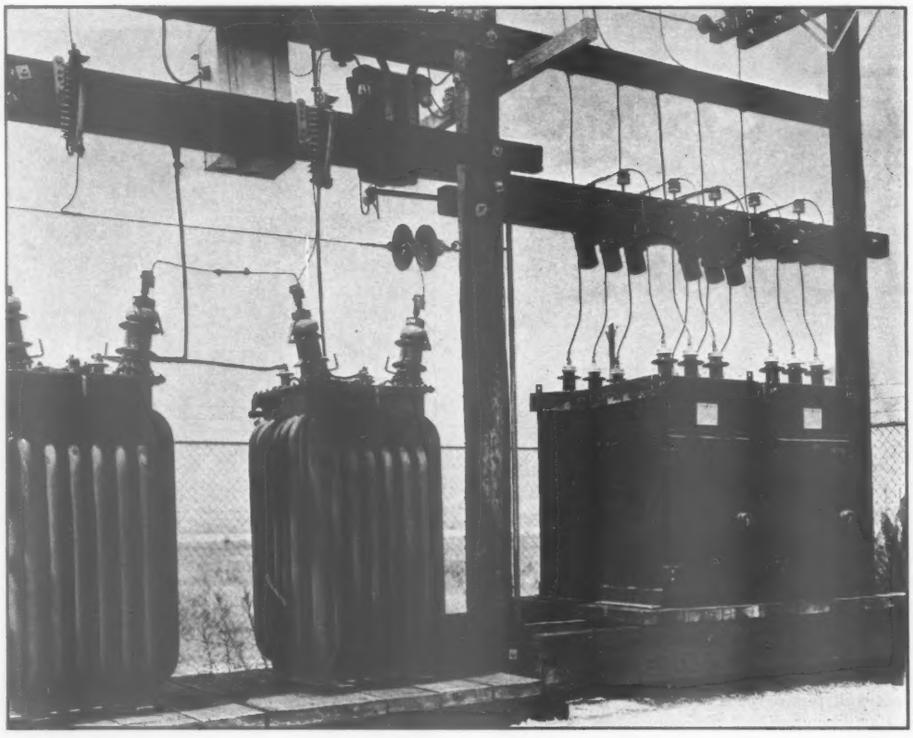
Illumination of the pump room is provided by a system which is very unique in that there

are no lighting fixtures inside the room. Mounted on the outside at each end of the building is a large weatherproof floodlight so placed that light is directed, through a window, into the pump room. Located in the motor room is a battery of floodlights mounted in such manner that the light is directed through windows near the top of the firewall and serves to illuminate the pump room from the side. The motor room is lighted by the use of conventional overhead fixtures. Connection plugs are provided in the motor room for service to small appliances, such as strip heaters and tools, and also to serve the electrical refrigerator drinking fountain.

The chief engineer's office, which is provided with electric heaters, is located in one end of the station and separated from the motor room by a windowed partition. Mounted on one wall of the office is the panel board of the remote control tank gauge equipment which operates on a balanced pressure principle employing compressed air. The level of oil in the large storage tanks is indicated by mercury column on the gauge board. Compressed air is supplied by a small motor-driven compressor located in the motor room.

Safety is a predominant feature throughout the station. The floor plan provides adequate space around each piece of equipment so that no operator need work in close quarters while attending the machinery. In the motor room the large V-belt drives are surrounded by guard rails, and in the pump room all gears and shafting are enclosed in sheet metal cases.

The installation which the Pan American company has made at Alvin demonstrates the flexibility of electric power service for pipe line operation as evidenced by the various types of service for which it has been used. Beginning with the gathering system, it is shown that electric pumps are available in many sizes, ranging upwards from as small as 5-hp., and may be located in buildings or, if weatherproof design is selected, no housing facilities are needed. The output capacity requirements of the Alvin station are as yet not definitely known due to the fact that the



Outdoor capacitor installation

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ELECTRIC PIPE LINE PUMPS
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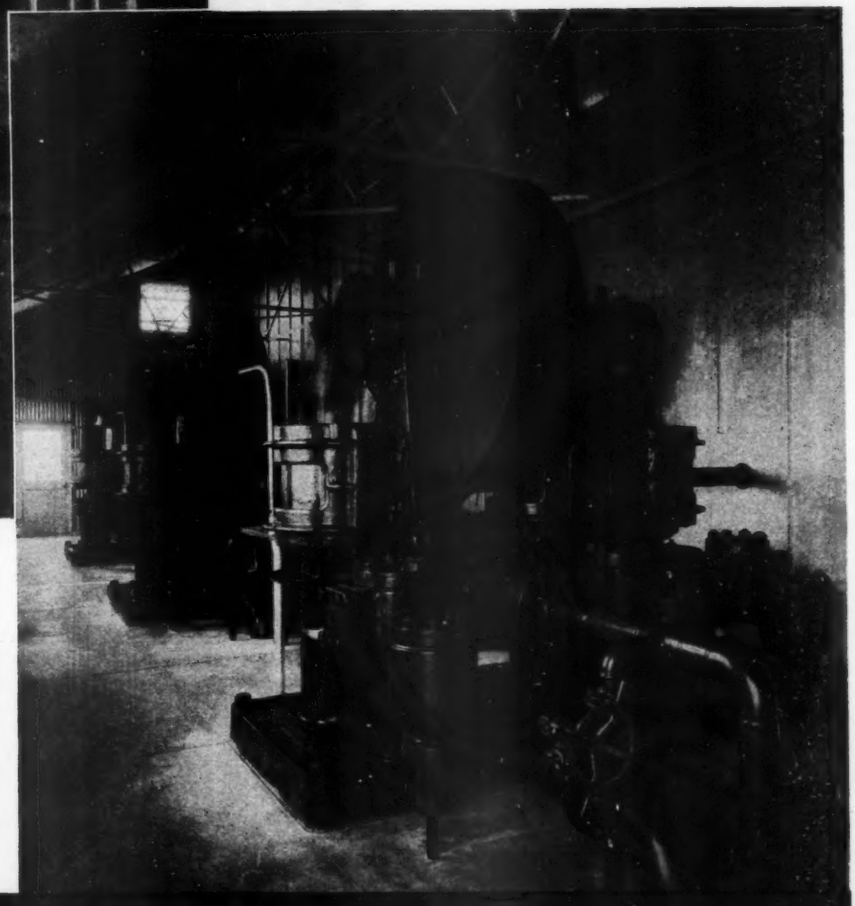
AND *Again* IT'S PURCHASED *Electric* POWER

PAN AMERICAN PIPE LINE COMPANY'S NEW STATION IN THE HASTINGS FIELD



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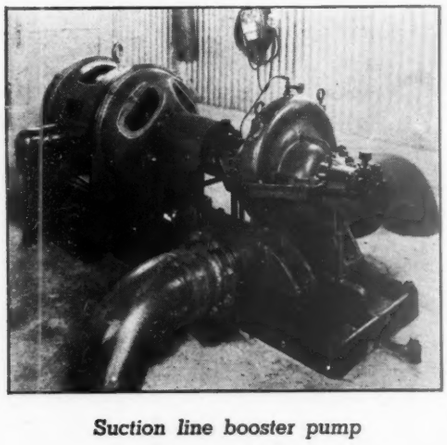
HOUSTON LIGHTING & POWER COMPANY

Hastings field is still in development stage and also schedules are affected by changing proration orders; consequently, the multi-unit station design more efficiently meets these varying conditions. In other stations located on main lines where reasonably stable high capacity deliveries are scheduled, motor-driven units of very large size may be used to advantage, and in connection with main line operation it has been found that electric power is particularly well suited for booster stations. In this service high-speed centrifugal units of large capacity may be installed at relatively low investment cost, the station may be placed in operation on very short notice, maintenance is slight and depreciation during idle periods is low. Further use of electric service is to be found at stations operating from large tank farms where small booster pumps in the suction lines between the tanks and the station may often increase the output of the station and thereby raise the performance value of the station by many times the cost of booster pump operation.

Valuable Service

Cathodic protection of pipe lines is another field in which electric power is rendering a valuable service. Due to dependability of supply and the small amount of attendance required, the trend now is toward the use of copper oxide rectifiers operating on purchased power.

Quite frequently pipe line stations are located in remote areas, and, consequently, it is necessary to provide complete residential facilities for the station personnel and their families. At the Alvin station and also at the campsites of the producing companies in the field utility electric service is provided for all the domestic applications such as lighting, refrigeration, cooking, ventilation, water supply and appliance operation. The provision of these modern conveniences adds considerably to the comfort, contentment and morale of the employes who must live and work at locations far removed from urban centers.



Suction line booster pump

Summary

In summation it may be said that utility electric service has many attractive advantages in the field of pipe line operations and that the value of this service is realized to a greater extent by the operators who make a more complete use and wider application of the service. It has been shown that, as a motive power for the main pumping operations in a pipe line station, electric power is readily adapted to a wide variety of services. Also it is seen that, in addition to being an efficient prime mover for pumps, purchased electric power makes a multi-use service for the operation of auxiliaries and associated apparatus whose use value is high and whose benefits may be secured at a relatively low cost.

ELECTRIC PIPE LINE OPERATION IN SOUTH ARKANSAS

By KENNETH C. JOHNSON
Industrial Sales Manager, Arkansas Power & Light Co.

One hundred horsepower motor connected to a pipe line pump. The latter handles up to 17,000 bbls. per day. This quantity of oil is pumped through an 8-inch line 12 miles

The increased number of oil companies in the South Arkansas oil fields that have installed electric motors on their trunk pipe line pumps and on their field gathering pumps in recent months is another indication of the trend of oil companies to install modern, efficient, dependable electric motors on such vital operations.

Purchased electric power is employed to operate these pumps because it has low installation, operation, and maintenance cost; is extremely efficient in all kinds of weather, causes less trouble, fewer repairs, smoother operations, and is easy to convey from one location to another; has low fixed charges, high salvage value, and is clean, quiet, and modern.

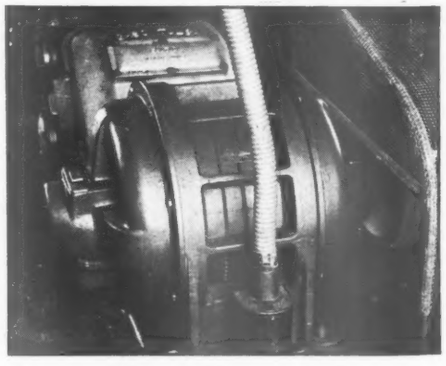
New Shreveport Pump Station Utilizes Electric Power

SHREVEPORT, La.—An electrically powered pipe line station has been installed to serve the newly discovered oil field on the edge of the city of Shreveport. Operated by the Atlas Pipe Line Corp. of Shreveport, the pumping unit and line began moving crude several weeks ago.

To allow for increases in crude purchases, as the field develops, a pump station with greater capacity than needed for current runs was installed, and operations can be stepped up to meet demand as further crude production in the field is developed. The single unit consists of a 7x12-inch Gaso pump, equipped with 6-inch liners at present. It is powered by a 100 hp. General Electric motor, served by a line from the system of the Southwestern Gas & Electric Co. of Shreveport.

The unit is capable of moving up to 9,000 bbls. of crude daily, although its present operation, on part time, does not approach that figure. The four miles of 6-inch screw line leads from the station, near Cross Lake spillway, to the Atlas refinery at Jewella.

Although the discovery well of the field, R. E. Allison No. 1 Ellerbee was completed on July 15, pipe line connections were not obtained for several weeks. Drilling development of the field, which may extend into the Shreveport city limits, was retarded pending a settlement of spacing rules to govern the activity. A temporary order fixing 40-acre spacing for tracts outside the city limits, and a 10-acre pattern in the city, has brought in several drilling rigs and the area will be tested in a number of important points shortly.



Moving Shreveport oil

The crude handled in the new line has a gravity of 43.9, a zero pourpoint and a sulfur content of 0.15 per cent. It is black green in color. No allowable production for the sole current producer has yet been set, and production tests have been made on a number of different chokes.

ELECTRIC MOTORS

(Continued from Page 163)

in series. This is a booster station on a 12-inch crude oil trunk line in Oklahoma.

The splash-proof motor, suitable for either indoor or outdoor non-hazardous locations, is essentially an open motor but with frame and bracket construction affording protection of the motor windings against dropping or splashing liquids including rainfall and with insulation adequate for these conditions (Figure 5).

For large units operating in hazardous areas,

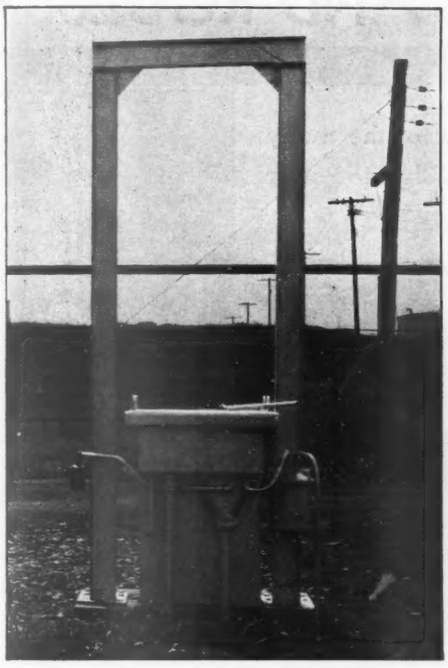


Fig. 7—Outdoor 2,300-volt oil immersed explosion-proof starter, full voltage and magnetically operated

the explosion-proof construction becomes relatively costly due to the physical size of the motor and the correspondingly heavy members required in an enclosure adequate to withstand the pressures possible of realization in an explosion of gaseous atmosphere within the motor housing. Alternative methods of meeting hazardous atmosphere conditions in large motors are provided by the gas filled motor and by the enclosed pipe-ventilated motor.

Three Forms of Construction

To compare briefly these three forms of construction:

The conventional explosion-proof motor is built with an enclosing housing of sufficient strength to withstand an internal explosion of gases which may accumulate within the housing, the frame fits and clearances being such as to prevent the emission of flame and consequent possible ignition of surrounding gaseous atmosphere. In this form of motor the removal of heat generated by the motor losses is accomplished by transferring this heat to the internal walls of the motor enclosure, passage of the heat to the outside walls of the enclosure and finally the removal of the heat from the external walls of the enclosure. The preferred method of accomplishing this heat transfer is by an internal circulation system set up by a blower within the enclosure, passing the heat-laden air through internal ducts provided in the motor frame, while external air is carried by a second outside blower through adjacent ducts, the wall section between the ducts being the medium through which the heat is transmitted from the internal ventilating system to the outside air. This system of ventilation is known as the dual ventilation or heat-exchanger principle.

The gas filled motor also employes a totally enclosed housing but substitutes for air in the internal circulating system, a gas which will not support combustion, this gas transferring the heat of the motor losses through a gas-to-air or a gas-to-water heat-exchanger to the outside. This construction requires the maintenance of a small positive pressure within the motor enclosures to prevent entrance of outside atmosphere, entailing the necessity of a constant and reliable outside make-up gas supply.

Motor Control

The pipe-ventilated motor employs an enclosing frame to which ducts are connected bringing ventilating air to the motor from a safe atmosphere location and discharging from the motor to such location. This type of construction is of course limited to very localized hazardous areas where it is feasible to extend ducts of moderate length to safe atmosphere location. Figure 6 illustrates an outdoor installation of this type consisting of a 500-hp. motor driving a pump handling gasoline from storage to a tankship loading dock.

Motor control may be of the conventional open type, weather-proof type for outdoor mounting, or explosion-proof for hazardous locations. In Figure 7 is an outdoor mounted oil-immersed explosion-proof 2,300-volt magnetically-operated full-voltage starter providing remote magnetic control of the 500-hp. outdoor motor just described.

Remote Control

The synchronous motors shown in Figure 4 are equipped with control providing for remote operation of this station from a dispatcher's station about 15 miles away. The station end of this supervisory control system is shown in Figure 8. This installation made several years ago is described in detail in The Oil and Gas Journal of June 4 and December 17, 1931.

Aside from the main pump motors, most pumping stations employ a few small auxiliary drives. These are ordinarily handled by squirrel cage motors, which may be of splash-proof or explosion-proof construction according to the needs of the particular installation. Such auxiliaries are ordinarily operated at 440 volts and controlled by magnetic full voltage starters.

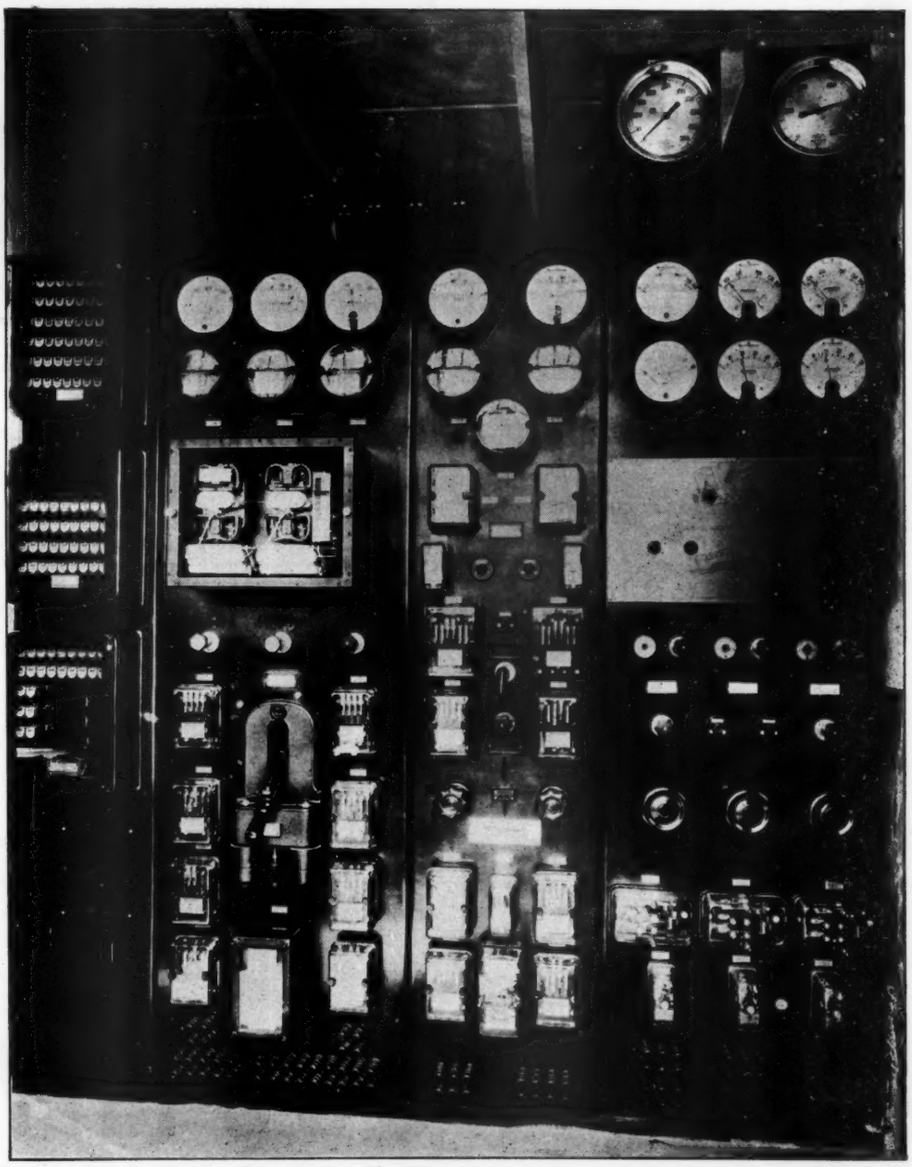
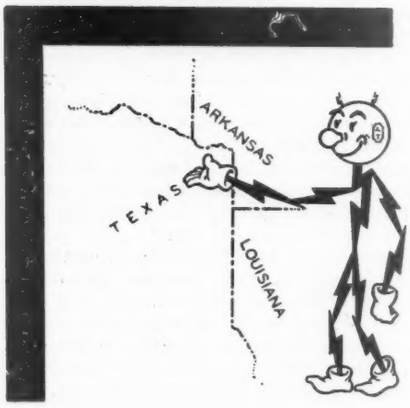


Fig. 8—Supervisory control at station end for three 800-hp., synchronous motors shown in Fig. 5, providing control of this station from a dispatcher's location 15 miles away

WHY



- Low first cost and low maintenance cost.
- Low fixed charges (taxes, interest, insurance, depreciation, etc.)
- Less trouble, fewer repairs, smoother operation, easily moved.
- Longer life—higher salvage value.
- Smaller warehouse stock of repair parts.
- Fewer accidents and less fire hazard.
- Easy to start in any weather.
- Operation can be controlled automatically.
- Counterbalancing easily accomplished.
- Accurate records easily kept.
- Less shut-down time.
- LOWER OVER-ALL COST, PER BARREL, OF FLUID LIFTED.

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Aerial Photographic Surveying for Pipe Line Location

By FRED Q. CASLER
Aero Exploration Co.

Ten years ago the aerial survey as an engineering instrument was still regarded as a very expensive plaything and not to be considered seriously with the practical aspects of routine engineering practice.

During the 10 years immediately following the World War, efforts were made by several far-sighted engineers and aeronauts to wage a campaign of education among the profession for the cause of aerial photography.

In 1930 we saw the development of several magnificient pipe line projects. These were trunk lines of large diameter and running from the Southwest in the Middle West, carrying crude oil, gasoline and gas to the large markets. Several of these projects accepted the aerial survey as an experiment and for the most part, found it highly satisfactory, conducive not only to efficient selection of right of way but facilitating acquisition: reducing the amount of condemnation by litigation and affording a great deal of intelligence of infinite value in construction. Since this period, the aerial survey has been used almost constantly by representative pipe line engineers, until today, its value is accepted beyond question.

It is safe to say that the pipe line engineer who would proceed today in the construction of a major project without availing himself of the wealth of information afforded him by the aerial survey is denying himself the advantage of his most useful tool.

The consistent use of aerial photography over the past decade has, of course, developed more efficient application of this type survey, particularly, in the field of interpretation.

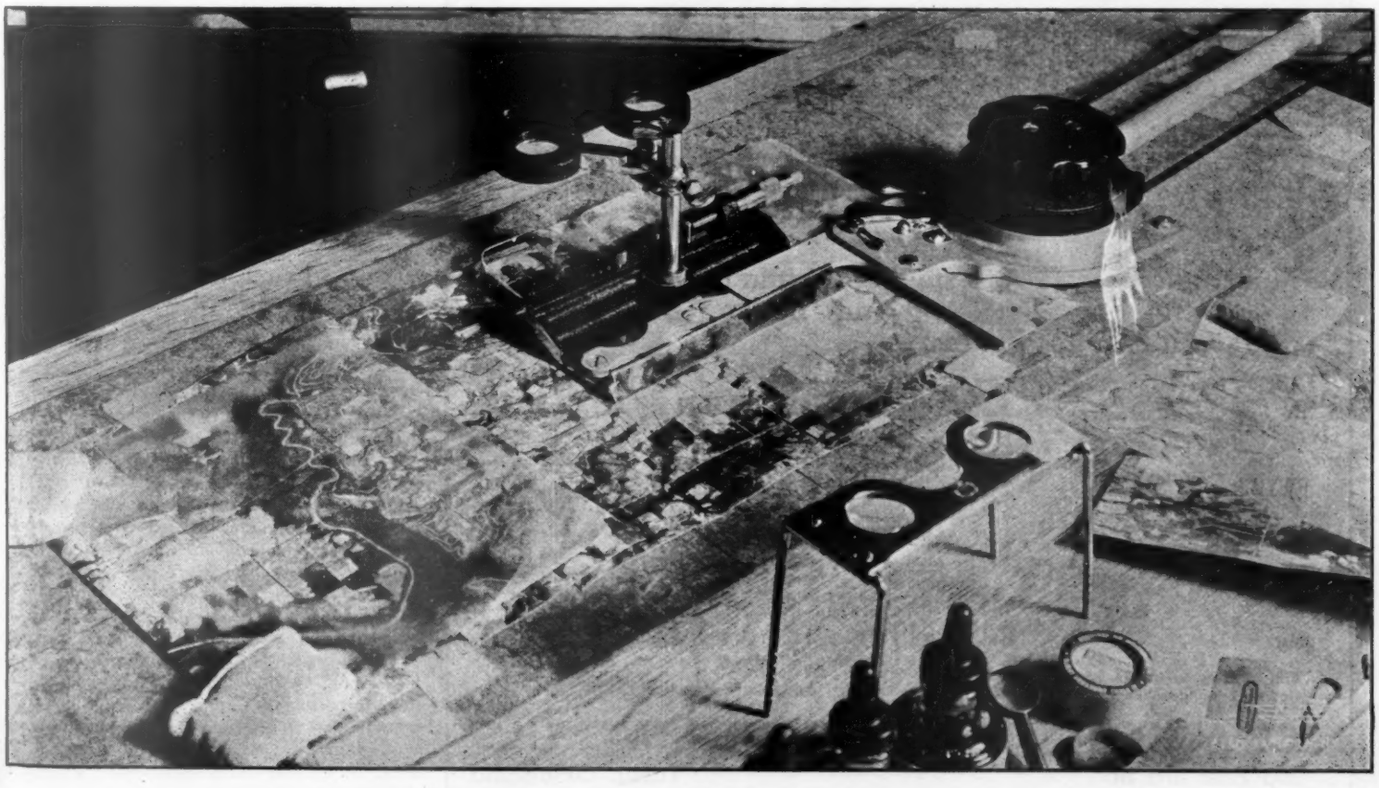
The selection of right of way is dependent upon many factors of which topography, cultural and the natural barriers constitute the important problems. Every right of way buyer is familiar with the situation of following a ground survey party which has climbed the farmer's fences, walked across his fields, chopped down the "old elm tree," and realizes fully the difficulty of dealing with this enraged individual. Today the location is made entirely in the office of the engineer from the aerial photographs. The first contact with the landowner is made by the right of way buyer. This factor, alone, is of such economic importance as to preclude the possibility of attempting right of way location by the preliminary chain and transit method.

The standard practice in producing a pipe line aerial photographic survey is for the airplane to fly at an altitude sufficient for the photograph to cover a strip of country 3 miles wide. This is now considered a sufficient width of country to get a satisfactory location through. The pilot flying the photographic plane stays as close to the center line of the tentative route as is possible. These negatives are then enlarged in the laboratory to a scale of either 6 or 8 inches to the mile, depending upon the wealth of detail desired. These enlarged photographs are then assembled upon a suitable medium to make a continuous strip map of the terrain to be traversed by the right of way. This is the master mosaic.

Furnished also, are a set of contact prints to afford stereoscopic or third dimensional observation of topographic features.

In recent years, with the development of several instruments for topographic measurement, the stereoscopic principle has taken on new importance. It is now, not only possible to make highly precise contour maps from the aerial photograph, but quick reconnaisance topography can be secured in a matter of a few hours, which before, would have been considered out of the question, due to the limitations of time and money.

Several aerial survey contractors have devel-



Stereo-comparagraph developed for oil industry reconnaissance problems

oped and are offering on one basis or another these instruments commonly known as "stereo-comparagraphs," "stereo-planigraphs," or similar names. All of the instruments, however, are based upon the principle of measurement of image displacement on the stereoscopic pair. These instruments, for the most part, fill the gap hitherto existing between primitive and inaccurate methods and the large and costly universal plotting machines operating at unnecessarily high precision for a large majority of oil field work.

With these machines the observer sees a relief model of his country, as well as a small speck commonly referred to as a "floating mark." The apparent elevation of this "floating mark" is controlled by a micrometer attachment, which permits its movement to any desired elevation. A pencil connected to this measuring mark permits of the direct drafting of a contour by the continuous tracing of the "floating mark" in contact with the ground.

In pipe line location the engineer makes the master mosaic which is, in effect, a continuous strip map of terrain over the proposed routing. His terminals, which may be a pump station or only the site where a pump station is to be erected, are readily identifiable in the photograph. He takes a fine silk thread and stretches it between the terminal points and proceeds to examine the country falling immediately under and in close proximity to this thread. Advantageous moves usually become immediately obvious and pulling the line slightly in one direction or another will often avoid difficult topographic conditions: hazardous stream crossings, prohibitive clearing of timber, avoiding such cultural barriers as orchards, private property and graveyards, all things which make the pipe line engineer's task more difficult.

Without the aerial survey these obstacles are all avoided, probably, but the transit man cannot include them in his problem of location until after they have fallen within his range of vision. All too frequently this necessitates turning an angle of unnecessary proportions. With the aerial survey the whole project lies before the engineer at a glance. His location is made, taking advantage of the best terrain and at the same time holding all angles to only a slight departure from the straight line. He may refer constantly to his stereoscopic equipment to examine regions of difficult topography, to examine a precipitous river embankment: he may study the tendencies of stream meanders and analyze the possibility of future washouts. The tendencies for sand bar development in river beds is information of importance. These tendencies disclose themselves readily through the aerial photograph.

Stereoscopic analysis will yield a preliminary profile where this is desired. The location of pump stations is completed with more intelligence than possible through the ground survey party alone.

When, finally, the engineer has his silk thread lying in the position which indicates the best and most economical location for his right of way, he proceeds to transfer the position of this thread permanently to the mosaic in ink, indicating all angles with their approximate departure from a straight line.

The mosaic is then reproduced photographically in convenient sizes for field sheets. These are turned over to the engineers who will stake the route as indicated. Experience has proven that changes in this route will be less than 2 per cent.

Ownership data is added to the master mosaic, indicating the boundaries of each parcel of property and ownership thereof. Reproductions carrying the ownership data are made, in convenient sized field sheets, which are turned over to the right of way buyer. His approach to the landowner is made with this sheet, which enables him to show the farmer exactly where the proposed route will traverse his land. This is usually the first intimation the farmer has of a right of way being contemplated. Furthermore, he is intrigued at seeing his farm photographed from an altitude of several miles in the air and his frame of mind is definitely advantageous to the buyer.

In recent years, the U. S. Department of Agriculture has photographed many millions of square miles for agricultural purposes and practically all farmers are today familiar with the aerial survey from the aspect of land measurement. They have learned to place confidence in this means of survey and accept the figures taken from the aerial photograph as authentic. Rodages scaled directly from the photograph are sufficiently accurate for computing payment.

A drawback to the intelligent applicaton of aerial survey lies in the fact that qualified men in the field of photogrammetry are at a minimum. However, the success of courses offered in "applied photogrammetry" as Syracuse University, made possible through an endowment from the Guggenheim Fund for the Advancement of Aeronautics has interested other universities in the possibility of including this work in their curricula. This work is actually being offered by several universities at the present time and plans are taking definite shape for its adoption in many others.

Many of these young men, upon graduation, will naturally find careers with many of the major oil and pipe line companies. Their services will all prove invaluable.

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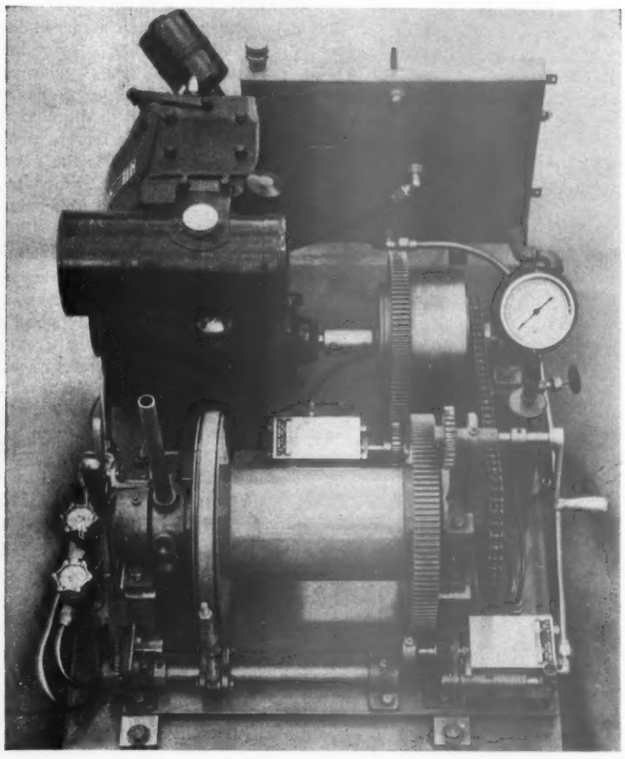

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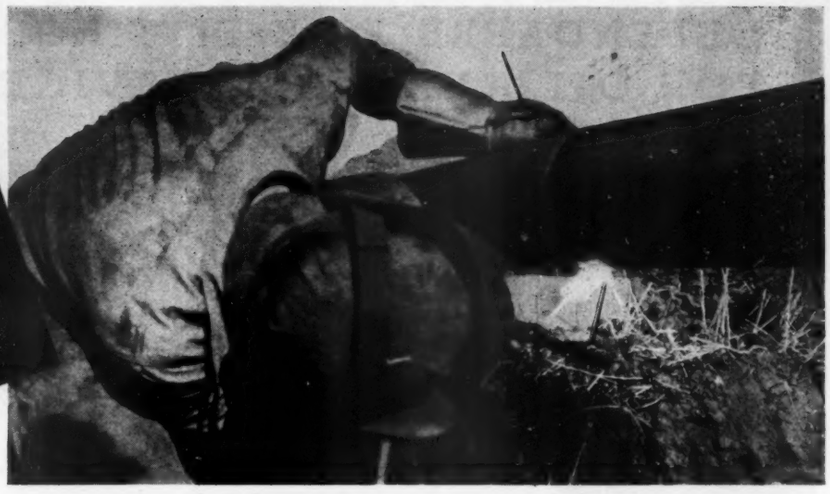

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ACTUAL usage in the field is the real test of an electrode. Used exclusively in the recent construction of the Great Lakes Pipeline Company's gasoline line near Ponca City, Oklahoma, the WILSON "Bell Hole" ELECTRODE, *specifically developed for bell hole welding,* demonstrated that it successfully meets requirements.

Here are the main features of this electrode. It is a high speed electrode, easy to apply. It gives deep penetration, providing welds that are high in tensile strength and ductility and free from porosity. It causes no displacement of parent metal and slag removal is exceptionally good. It is carried in stock in 5/32", 3/16", 1/4" and 5/16" diameters.

Ask for a demonstration of the WILSON "Bell Hole" ELECTRODE and see how it simplifies the job of bell hole welding. Or if you want to try it yourself, a request on your business letterhead will bring you a sample. Write today.

FOR BEST RESULTS

use WILSON Arc Welding Machines "the machines that make the arc behave." They simplify welding and keep down costs. Catalog on request.

A section of the Great Lakes line under construction. Above is a close-up of a bell hole weld in the making. Welding Contractor: H. C. Price Company, Bartlesville, Oklahoma.

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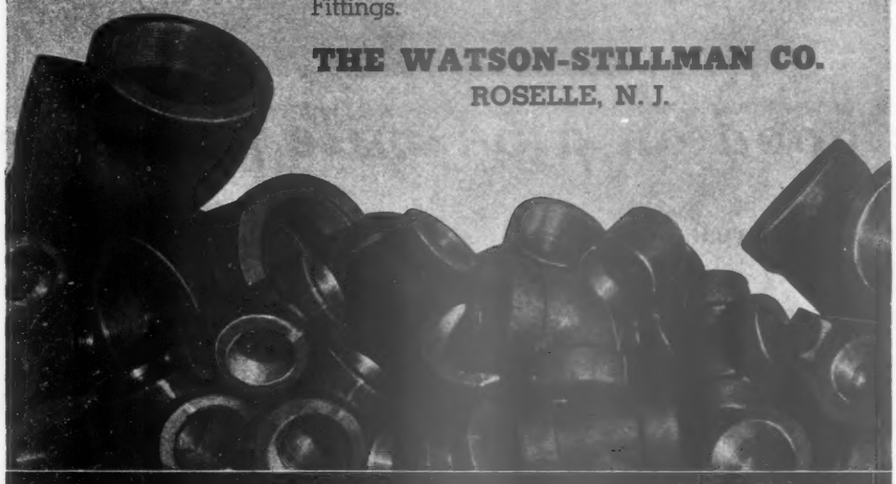

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KENNEDY pipe line valves have thoroughly proven their sturdiness, ease of operation and lasting reliability in installations all over the country. They are generously proportioned in every detail with massive bodies and flanges that resist distortion from pipe line strains and with strong, efficient operating mechanisms that assure tight closure and quick release.

Other Kennedy Valve types for the oil industry include 400-lb., 700-lb., 1000-lb., 1600-lb. and 2500-lb. test gate valves, together with valves for general service; and complete lines of malleable iron screwed fittings and cast iron flanged fittings.

Write for the Kennedy catalog which fully describes and lists all the Kennedy products.

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KENNEDY
VALVES-PIPE FITTINGS-FIRE HYDRANTS

UNITIZED PUMPS

(Continued from Page 93)

stations at irregular intervals on the line. This fact necessitated calculating the pump performance for different engine speeds.

The heavy solid vertical curves represent the line characteristics between the various stations. The eight bottom dotted "head capacity" curves show the performance of the 3-inch four-stage centrifugal pump at various speeds; and the upper five dotted "head capacity" curves represent the performance of these two types of pumps in series. Similarly, the eight lower solid line "head capacity" curves represent the performance of a 4-inch four-stage centrifugal pump, and the upper five broken line "head capacity" curves show the performance of these two pumps in series. On the bottom of the operating curve, the brake-horsepower required for each of the three prime movers at various speeds is graphically illustrated.

To illustrate the manner in which the curve is used, the following example may be studied:

The distance from the O'Connor station to the Taft station is 18.5 miles. The capacity required is 15,000 bbls. per day. Reading upward from the "barrels per day" line at the bottom of the chart, "O'Connor to Taft" line characteristics curve, it will be seen that the point of intersection is slightly above the "head capacity" curve of two 4-inch, four-stage centrifugal pumps in series, at an engine speed of slightly more than 775 r.p.m. Reading to the left of the point of the intersection noted above, it will be seen that the pressure required to deliver the 15,000 bbls. per day through the 18.5 miles of 6-inch line is 800 pounds per square inch.

To find the brake-horsepower required to drive each pump (brake-horsepower includes speed increaser gear losses), it is necessary to start at the "15,000 bbls. per day" point and follow the dotted line upwards to a little over the "b.h.p." (solid line) curve, at an engine speed of 775 r.p.m. by reading the "brake-horsepower required" scale shown on the right-hand side of the chart, it will be seen that each unit requires approximately 135 brake-horsepower. As the point of intersection of the "b.h.p." curve is below the 69-pound "b.m.e.p." curve for the eight-cylinder engine, there is no possibility of overloading the engine.

In Table 1, it will be noted that the total weight of each of the three unitized engine-driven pumps is from 10,000 pounds to 17,000 pounds. Comparable capacities of reciprocating pipe line pumps weigh approximately from 25,000 pounds for 8,000 bbls. per day pumps to 65,000 pounds for 24-inch heavy-duty duplex pumps having a capacity of 24,000 bbls. a day. These weights are of the reciprocating pump only, and do not include the added weight of the prime mover and its auxiliary equipment. As a result, the unitized engine-driven centrifugal pump units only weigh from 700 pounds to 1,000 pounds per 1,000 bbls. daily capacity, as compared to the complete conventional reciprocating nonportable pump units that weigh from 5,000 pounds to 6,000 pounds per 1,000 bbls. of daily capacity.

The high-speed multi-cylinder engines' initial installation and operation cost have been a primary factor in proving the economic value of high-speed engine-driven centrifugal pump units. The three sizes of engines used on the unitized centrifugal pump units shown in the table weigh from 32 pounds to 54 pounds per rated horsepower at 70 b.m.e.p., and their initial cost, f.o.b. factory, is from $27 to $31 per rated horsepower. While the high-speed engine initial cost is comparable to those obtained on the slow-speed engine (when the horsepower rating is based on 70 b.m.e.p.) the prices include the following auxiliary equipment usually not included in the base price of slow-speed engines:

1. The high-speed engines have large capacity radiators equipped with blower-type fans which eliminate the added expense of an auxiliary water-jacket cooling system. The blower-type fans of these radiators help to keep the heat and gas fumes out of the pipe line stations when the radiators are installed in the side walls of the station building. Due to the comparatively small amount of water used in each radiator, distilled water is recommended for water cooling, since its use eliminates the formation of

NATIONAL Reliable AUTOMATIC SHUT OFF VALVE

Varied and extensive losses are caused by air entering pipeline gathering systems. These losses include: Loss of gravity and volume, losses due to increased run time, and general decreases in efficiency of gathering system as a whole. Numerous other more or less important losses are incidental to average operation. Not only do those losses ordinarily occur, but they are combined with certain hazards, mistakes and guesswork in operation which are expensive and disagreeable.

The National Reliable Automatic Shut Off Valve is designed to reduce these losses to a minimum. Positive in its operation; semi-automatic, assuring certainty at all times whether the valve is open or closed. The valve is hand opened and automatically closes when the fluid level drops in the body of the valve. Therefore, there is no guesswork connected with its operation.

The Reliable Valve has been thoroughly tested out by actual installation and thorough test under various field conditions before being offered for distribution. It has been proven in every respect. It is complete in one unit; requires no auxiliary stops, checks, etc.

Only one valve is needed to each tank battery.

Prices and specifications on application.

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- ✓ Eliminates guesswork in connection with runs.

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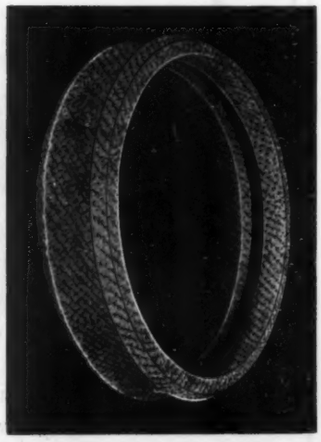
Use Tite-Line Couplings for inexpensive rapid assembly of lines, headers, manifolds and general hookup work.

Made in most popular line pipe sizes. Of all forged steel construction.



NATIONAL TANK COMPANY

TULSA, OKLAHOMA, U.S.A.

water-jacket scale that would cause frequent shutdowns for "boiling out."

2. Four-cylinder gasoline engine starter units have been attached to the frame of each engine (as note on accompanying unit plan) and makes the engine complete for use as portable prime movers. With the starting equipment an integral part of the engine, the purchase of a central air or electrical starting unit is not required.

3. Each unit has been equipped with its own individual instrument panel having oil and gas pressure gauges, tachometer, carburetor and ignition controls. By having all the instruments and the controls located at a central point on the unit, the operation and adjustment of each engine has been greatly simplified. From a safety standpoint, the use of water temperature and oil safety switches have also been made standard equipment on these unitized central pump units.

The two major factors governing the operation economics of any machinery is the amount of repair and the machinery oil consumption. In the following table, the average oil consumption for high-speed multiple-cylinder engines is submitted:

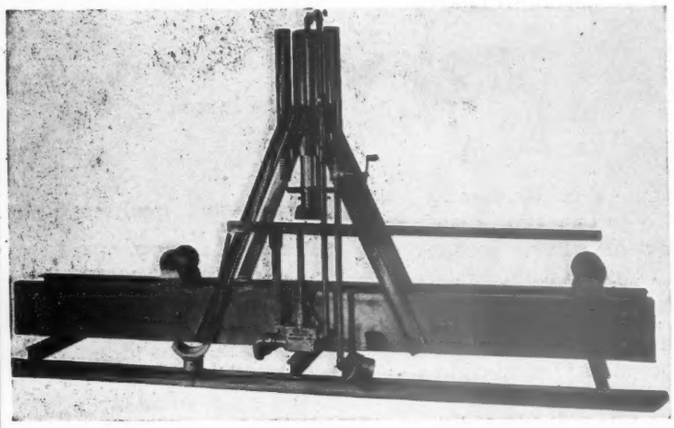
Hours of service—	Hp. hours per gallon
New engine	2,400
2,000 hours	1,600
4,000 hours	1,200
6,000 hours	800

It will be noted that the oil consumption of these engines increases with the hours of service. This is not due to mechanical failures, but the carbon deposits in the oil passages in the pistons and piston rings which greatly impairs the efficiency of the rings. By cleaning the pistons and rings, the oil consumption can usually be reduced to normal.

Quite often sludging and emulsifying lubrication oil conditions in the engines result in increased oil consumption. The development of closed breather or crankcase ventilation systems, together with a dry sump lubrication system, have been recent improvements that have resulted in improved engine performance relative to carbon deposits of the piston rings and the resulting lower oil consumptions.

The maintenance and repair of the unitized engine-driven centrifugal pump units indicates that the costs of operation for this type of unit will be from $1.50 to $2 per horsepower per year. This cost of repair and maintenance is principally repairs to the prime mover of these engine-driven centrifugal pump units since the repairs and maintenance to both the centrifugal pump and speed increaser gears is practically negligible. It has been found necessary to clean the carbon from the piston rings and grind the valves every 4,000 to 5,000 engine working hours.

Model "A" Duo-Hydraulic Pipe Straightener



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Ram Stroke 18 inches. Ram Pressure 45000 lbs. with ease.

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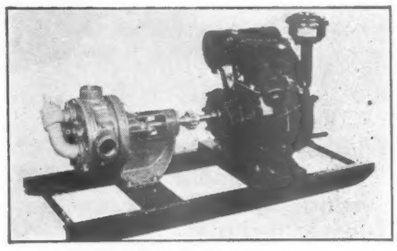

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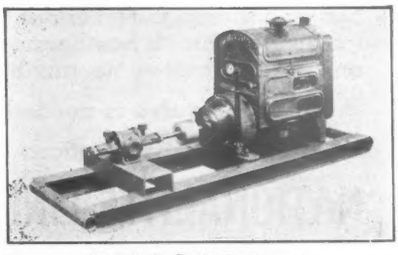

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PHOTO shows 12" Mono-Cast Doublex Simplex Pipe being installed for high-pressure natural gas service to the new plant of the Aluminum Ore Co., near Mobile, Ala. The line lay through swampy river bottom land, where quicksand and water were frequently encountered and surmounted by the flexible leak-proof Doublex Simplex joint. For literature on Cast Iron Pipe for super service in gas and oil transmission and distribution, address Acipo office nearest you.

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This periodic repair—made approximately every six months—usually requires the following labor and material cost when using the eight-cylinder high-speed engines:

Item—	Grind valves and clean piston rings	Grind valves and new piston rings
Labor	44 man hour	44 man hour
Material	$23.65	$63.25
Machine work	4.00	4.00

In conclusion, it may be said that the application of the unitized engine-driven centrifugal pipe line pump units has been found to have comparable operating economies to the conventional nonportable equipment usually installed in permanent pipe line stations. Proration conditions governing the supply and capacity of oil to be pumped by individual pipe line stations have of necessity required the use of portable pipe line units to reduce the intangible cost of pipe line station investments.

Gasoline and the Consumer

(Continued from Page 88)

States has declined in the past 15 years from 21.06 cents per gallon in 1923 to 14.58 cents per gallon in 1937. During the same period, and for the same cities, the average sales tax, federal and state, has increased from 0.91 cent per gallon in 1923 to 5.40 cents per gallon in 1937. Expressed in dollars per annum per motor vehicle, the sales tax cost to the motor-vehicle user has increased from $4.37 in 1923 to $35.37 in 1937. Recalculating the retail price of gasoline in 50 representative cities (excluding sales tax) in the form of index numbers with 1926 taken as a base of 100, and comparing the results with the Bureau of Labor Statistics price index of 784 commodities, at wholesale, which has a like base, we find that in 1937 the retail price of gasoline averaged 69.5 per cent of the 1926 level, whereas the index of 784 commodities stood at 86.3 per cent of the 1926 level. Furthermore, taking the two indexes at 100 for 1932, the year of lowest commodity prices during the great depression of the early thirties, we find that gasoline in 1937 averaged 110, whereas 784 commodities averaged 133; in other words, on the rising trend in commodity prices from 1932 to 1937, gasoline increased only 10 per cent, while 784 commodities increased 35 per cent.

The retail price of gasoline (ex sales tax) for the period under review may be measured, additionally, not in terms of dollars but in terms of general commodities, by dividing the index numbers representing the wholesale price of 784 commodities, by the index numbers representing the price of gasoline. This computation yields a series of figures expressing the purchasing power of 784 commodities in respect to gasoline. The results are given in the last column of Table 3 and show that, exclusive of gasoline sales taxes, a parcel of all commodities would have exchanged for, or "purchased," 24.2 per cent more gasoline in 1937 than in 1926, and 18.9 per cent more gasoline during the five years ending with 1937 than in 1926.

Conclusions

Mr. Berle in a recent memorandum addressed to the temporary national economic committee stated "... the only practicable method of handling an investigation of the industrial system today is to assume that people are entitled to want what they actually do want; and to define economic efficiency as giving people what they want."[2] This statement prompted the writer to examine the record to ascertain if the people got what they wanted in so far as gasoline is concerned. Apparently they did. At least they were enabled to purchase gasoline in ever-increasing volume through good times and bad; the quality of the gasoline they bought steadily improved; and the prices they were required to pay carry the suggestion that there must have been a background of great technological progress in the oil industry, the fruits of which were transmitted to the consumer.

[2] "Berle Memorandum of Suggestions to the Temporary National Economic Committee," made public by authority of Senator Joseph C. O'Mahoney, published by the Kiplinger Washington Agency, August 23, 1938, p. 6.

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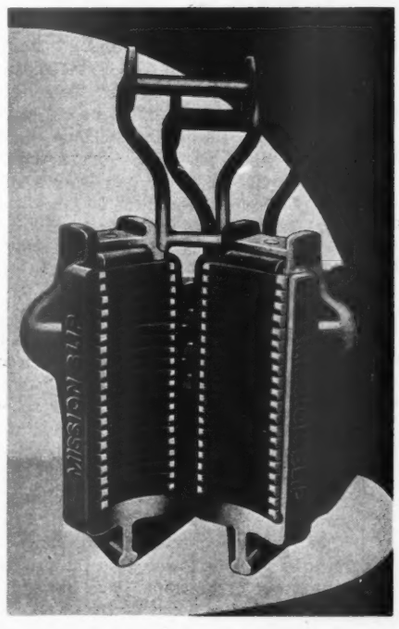

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Automatic Shut-Off Valve in Gathering Line Service

Shut-off valve connected with two tanks at an Illinois battery

A major pipe line company with an extensive gathering line system in the Nowata field has installed an automatic shut-off valve which has been designed to get ride of one of the most persistent troubles connected with gathering line operation.

Air getting into a gathering line, when the fluid level in the producer's tank drops below the pipe line's connection, increases the difficulty of pumping oil to the lines leading from the field. To stop this, the gauger often finds it necessary to make extra trips to producers' tanks. Furthermore, the pipe line company, as the result of air in the line, has to take losses in gravity and volume, losses due to increased run time and losses due to general decreases in efficiency of the gathering system as a whole. In addition there are other troubles which follow along with these difficulties. In the past certain makeshift devices have been used in tanks such as glass balls and croquet balls for the purpose of keeping air out of the line. Recently several shut-off valves have been designed to cure this trouble. To function satisfactorily, a shut-off valve must be constructed so as to function properly under the conditions existing when oil is flowing through the line; it is also desirable that it operate in such a way that there can be no question as to the fact that it provides a positive shut-off of both air and oil, thus eliminating the possibility of occasions arising where unjust claims may be made against the pipe line company.

The problem of designing shut-off valves has occupied the attention of a number of pipe line employes. The shut-off valve, installed on the major pipe line system in the Nowata field, was invented by a pipe line employe, now located at a trunk line station, who had been stimulated to solve the problem of air in lines, at a previous time when he was stationed in a gathering line district. The valve is now being made by the National Tank Co., Tulsa. The valve is constructed so as to have no pockets where sediment or water might collect. The inlet allows the oil to enter the valve above the float ball. There is a center dividing section in the valve and the oil coming through the inlet is allowed to flow into the outer section by means of a tray or trough. The overflow from the trough fills the back section of the valve, keeping it full so that the float will be buoyant; this keeps the valve seat in a locked open position until the oil in the producer's tanks reaches the outlet flange level and the oil ceases to overflow from the trough into the back chamber. The oil in the back chamber then flows out through a hole in the center section and passes through the outlet. The float ball then drops and disengages the lock on the valve seat, allowing the valve to close automatically.

On the top of the valve seat there is a small ball and seat check valve which will relieve pressure caused by atmospheric heat. In the body, in the outlet side of the valve, there is a swing check installed which eliminates the necessity of installing auxiliary stops, checks, etc. An air eliminator can be used in connection with this valve, which can be screwed into the top cover if the shut-off valve is to be used in connection with an oil meter. An air eliminator with this type of valve is needed only when used with a meter. Otherwise, it is entirely unnecessary to have an air or gas eliminator which adds to the fire hazard around tank batteries. When the gauger turns the stopcock to run the oil, the clapper valve seat in the body of the valve is closed, same having been closed automatically by the tank when the tank was run on the previous day. When the gauger turns the oil on, the oil from the tank goes through the line to the valve, carrying air and gas with it. The oil cannot get past the valve seat because the valve has not yet been opened by the gauger; therefore, air and gas are forced to the top of the valve and back along the top of the pipe line to the tank. Then, when the gauger opens the valve handle to run his oil in the gathering system, both the body of the valve and the line from the tank to the valve are void of all air and gas.

All that is necessary in operating this type of valve is for the gauger to give the handle a counter-clockwise movement upward; this engages the lock, in the top of the valve seat, to the locking hook on the float ball assembly; and the gauger turns the handle back down and the valve can only be closed automatically when the fluid level in the producer's tank reaches the outlet flange level. The valve is designed to be fool proof against being opened or closed, as when there is no fluid in the valve the float ball is down and not in the locking position. When oil is going through the valve, with the float chamber full and the ball buoyant, it cannot be unlatched until the fluid level in the valve is lowered by the producer's oil running out of the tank. The body of the valve is constructed of heavy cast iron and is suitable for rough pipe line handling. It is tested beyond any pressures that may be put on the line. It has a threaded inlet and outlet so that any type of connection can be used. The automatic shut-off valve has been tested under field conditions for several years before being offered for distribution to the pipe line industry this year. At present it is installed in the East Texas, Oklahoma, Kansas, and Illinois fields.

As an example of the way it is applied, the following case may be cited. Oil flowed slowly by gravity from a producer's tank to the principal gathering line 3,000 feet away. The pipe line installed a suction pump on the end of the line. Due to airbinding trouble, it was necessary to have a gauger shut off the tank 6 inches above the flange level. The installation of the valve freed the gauger from the necessity of making this extra trip.

Automatic shut-off valve installed at producer's tank

Wind's Behavior Affect on Cathodic Protection

By ROBERT J. KUHN
Consulting Engineer, New Orleans, La.

The use of wind electric generating equipment for the cathodic protection of pipe lines from soil corrosion has made it necessary to inquire into the behavior of the wind, upon which the protection units depend for motive power.

The Weather Bureau keeps excellent records of winds at its many observation stations which have been found to be very valuable in cathodic protection work. In several widely scattered parts of the United States we find the men in charge of these stations very cooperative in furnishing wind and other weather data which is available. Weather Bureau observatories are widely scattered and since there are many local factors which may affect the winds in the vicinity of a cathodic protection installation it was decided to make tests which would throw some light on the behavior of the winds as they affect a particular station and at the same time secure operating data on the protection unit in question.

Recording Ammeters Used

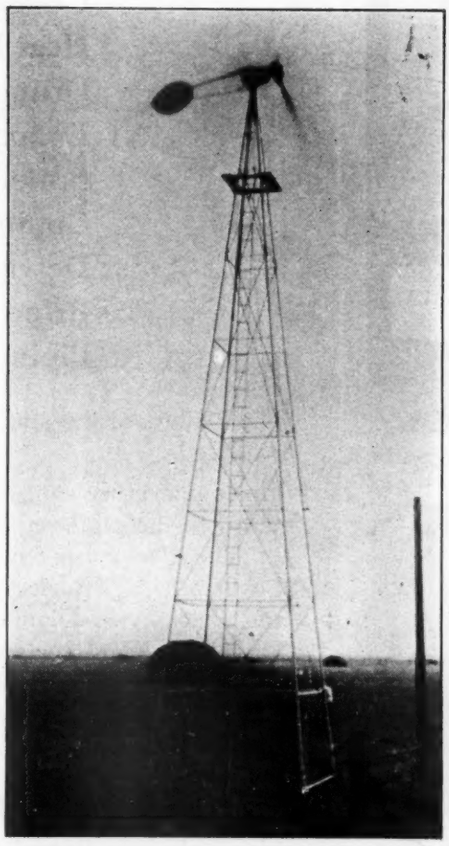
The ultimate object of a wind-driven cathodic protection station are the amperes produced. The amperes are a direct function of the wind and the measurement of the amperes will give an idea of the behavior of the winds and of the output of the machines. Accordingly 24-hour Bristol recording meters were set up acting as ammeters in the windmill circuits. These particular meters employed a smoked chart upon which scratches were made by the needle of the instrument. Upon completion of the test after 24 hours, the charts were removed and "fixed" by dipping in a light shellac solution which permanently sets the smoked surface so that the record will not be disturbed in future handling or filing of the charts.

On a wind-driven cathodic protection installation in Texas near the Mexican border, the output ranged from 0 to 45 amperes maximum. This record is not the best production record since it was made at an early date when the electrical circuits of the installation were not finally adjusted.

Characteristics of Winds

The chart is, however, an excellent one to demonstrate the habits and variability of the wind and the typical general performance of a wind electric unit employed on cathodic protection work. Examining the chart we notice in the morning hours before noon a highly variable wind ranging from light zephyrs to fairly strong puffs. In fact, the chart indicates several complete stoppages of the mill for some minutes' duration. These stoppages are short-lived, however, for in the next few minutes we notice fairly high values of amperes on the puffs. Between 10 a.m. and 12 noon, the regularity of the puffs is noticeable with one nearly every 15 minutes. These regular swings greatly resemble the swings made on these same smoked charts when used in electrolysis surveys in the vicinity of electric railways due to the periodic headway of the cars or trains. About 12:30 p.m. the wind begins to pick up somewhat, the average increasing and the minimum keeping well above zero. While there is a continuance of good winds in this period, the characteristics remain somewhat like those of the morning period with the periodic peaks and depressions still evident. However, from 2:30 noon until 7 a.m. the next day with perhaps one exception at 1:45 p.m. the mill never came to a complete stop again.

The fairly constant puffing and stopping or nearly stopping of the wind during the greater portion of the day period resembles somewhat the breathing of the often pictured giant whom we see blowing blizzards down upon us. Why the puffs and still periods? The weather map shows



Typical windmill for cathodic protection

low- and high-pressure areas with the surface winds scurrying from the high to the low areas. We would expect variations due to turbulence and other factors but not fairly regular periodic variations.

Effect of a Squall

It is now getting dark and what is happening? Threatening clouds hang in the distance. Lightning crashes and thunder peals. The wind drops at 7:15 to a steadier gait. What is this, a lull before the storm? Well, it looks like that is the case for in 15 minutes it strikes and it begins to blow and up goes the ammeters to new heights around 8 p.m. Greater heights would have been recorded but, with the governing action on the unit beginning to function at about 20 miles per hour wind plus the then unregulated electrical circuits, the output was hampered somewhat. This chart does not record accurately a picture of the wind during the squall but does indicate high winds. For the remainder of the night following the squall the wind kept up a merry pace with less variation when compared with the variations during the day.

Wind at Night

At 1 a.m. the wind begins to die down and by 2:15 a.m. it nearly stops entirely except for a slow monotonous grind with little variation which lasts until 7:05 a.m. when it dies completely for 15 minutes. At 7:20 up starts the breeze again like a workman returning to his labors after a night's rest. The record on the early part of the second day so nearly resembles that of the day before that an hour's overlapping of the record is hardly noticeable. Several charts showed low wind periods during the early morning hours, the characteristics of the charts being very similar.

Record on Second Installation

A chart was obtained on another wind-driven electric unit of a different make than the unit previously described. This second unit seems to be less sensitive to the wind variations than the first unit. This second unit is a geared affair and it, too, was not operating at its best when the record was made but from a wind standpoint the chart is worth showing. This chart was made on September 3 and 4, 1937. This chart reveals, too, an increase in the afternoon over the morning breeze, two squalls, one about 3 p.m., and the other about 6:30 p.m., higher winds in the early night following the second squall, and a general letdown at 10 p.m. when the mill stopped. In this case, however, the night rest period was broken by three fairly good periods of winds which stand out very sharply against the practically calm periods. This day the alarm clock must have been a little early for at 6 a.m. sharp, the wind began its daily duty at a vigorous pace without any hesitation.

The scale on Figure 2 was also 50 amperes full scale. The maximum current recorded was 43 amperes and the 24-hour average 10.1 amperes. As said before, these tests were preliminary and the currents obtained should not be regarded too seriously in this reading, these particular charts being shown mainly for a consideration of the behavior of the wind.

Differences in Wind at Nearby Locations

Of interest is a chart made on the same wind electric unit from which the second chart was obtained but made simultaneously with the first chart. These two cathodic protection stations are on the same pipe line, separated by only about 3 miles. This chart reveals similar characteristics for the entire 24 hours except at night, for in this case the letdown, can be seen, is lacking. There is some slackening but in the first chart the wind nearly dies down to zero but in the third it main-

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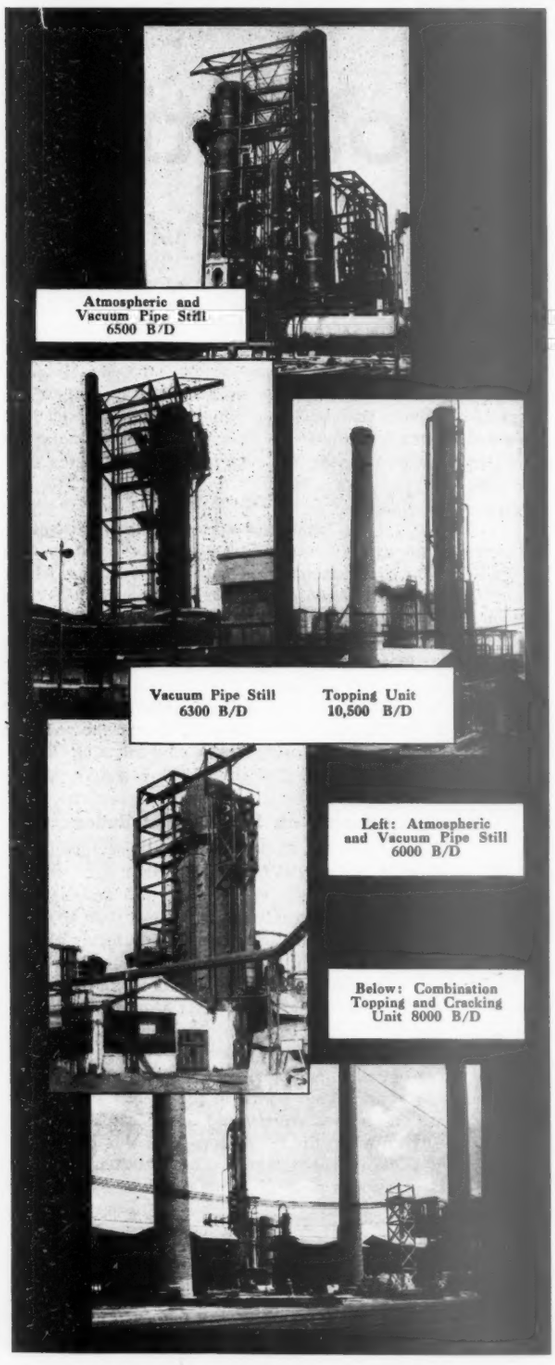
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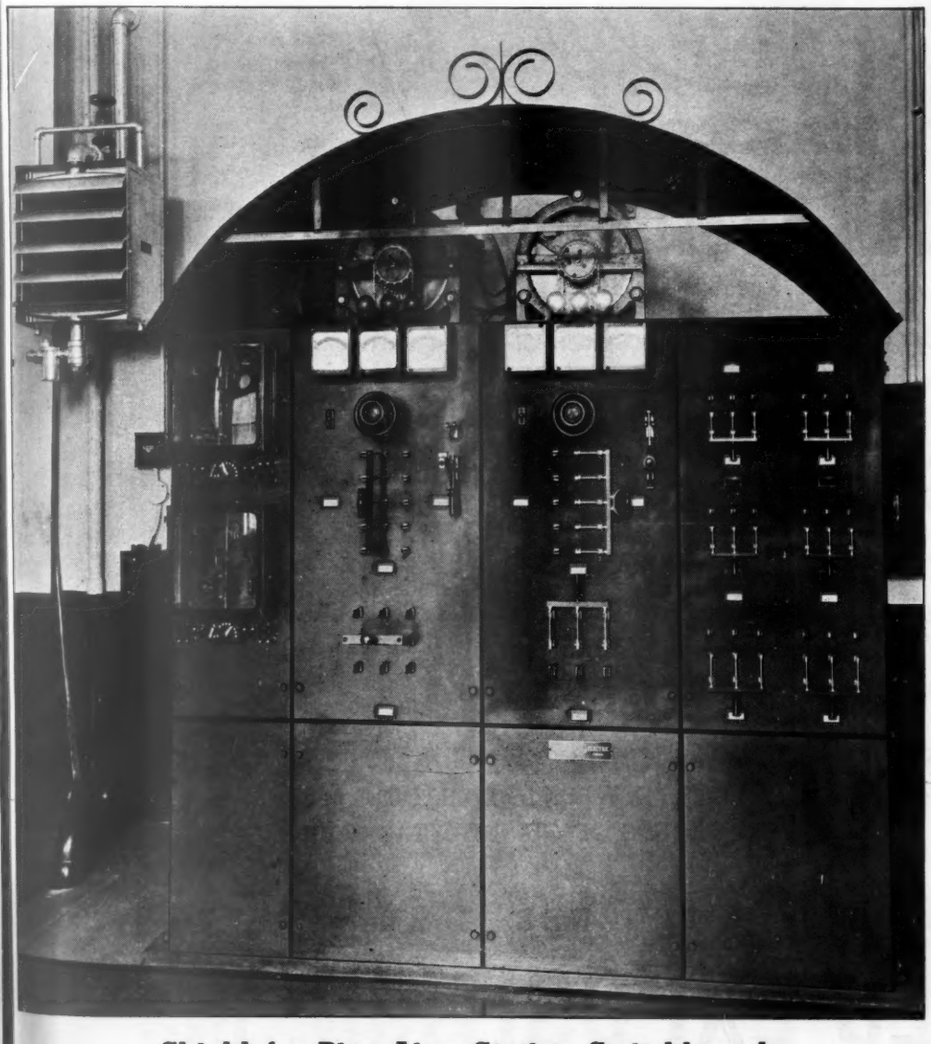
tains values which are nearly as high as those before noon.

Just why these differences has not been entirely established. These mills are in gently rolling dry western country, the hills being higher than the tops of the mills but these crests are many thousands of feet from the installations. There are no water courses except an occasional earthen tank for cattle and most of these were dried up at the time of the tests. The hills and valleys may have been partly responsible for the differences but since we did not have wind direction recording instruments available, such a correlation was not possible at that time.

Practical Value in Cathodic Protection

It may be asked what is the practical value of all this? Well, in the first place, let us consider that these windmills are erected in order to produce direct current electricity to prevent soil corrosion of the pipe lines or to provide cathodic protection as we call it. Cathodic protection is a generally continuous process requiring the continuous generation of electricity within practical limits. Our present knowledge of the protective action of the cathodic currents informs us that, even though the current be turned off, there still exists polarization and chemical changes in some cases which carries over the protective action partly, if not entirely, for some time. Use has been made of "intermittent cathodic protection" to save electric power bills in some instances where purchased energy was used. The null period in some such cases has been confined to minutes or fractions of minutes. With windmills, we know there are null periods and it is desirable and necessary to know to some extent the duration of these periods and the characteristics of the operating periods in order to properly judge whether protection is being afforded to the pipe lines in question.

Much research work is possible and needed along these lines by the pipe line companies and engineers. The use of recording wind velocity meters and recording wind direction meters in direct conjunction with the recording ammeters would make a most valuable record in this line of research and practice. Long-time records of electric generation have also been made by other methods but they will not be discussed in detail here. These records reveal that the wind, although variable from second to second, hour to hour, day to day, and month to month, nevertheless has some qualities of constancy and that, in general, it is nearly always on its way despite the seemingly null periods. Referring again to sailboats, it is only the expert who can sail a boat to victory in apparently flat air and so it is with the windmills, the best equipment will generate when others are standing idle and these studies will help differentiate between the various types of equipment as well as give a picture of the wind which is available for all makes of mills.



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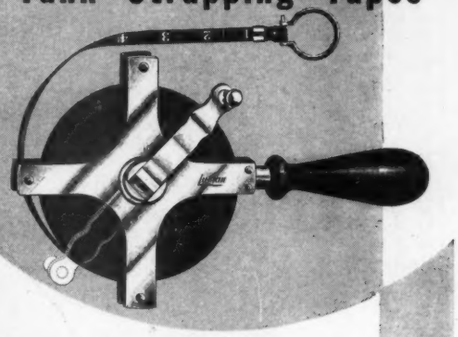

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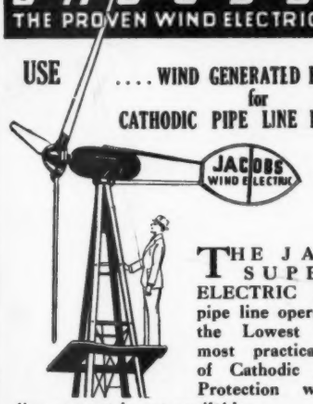

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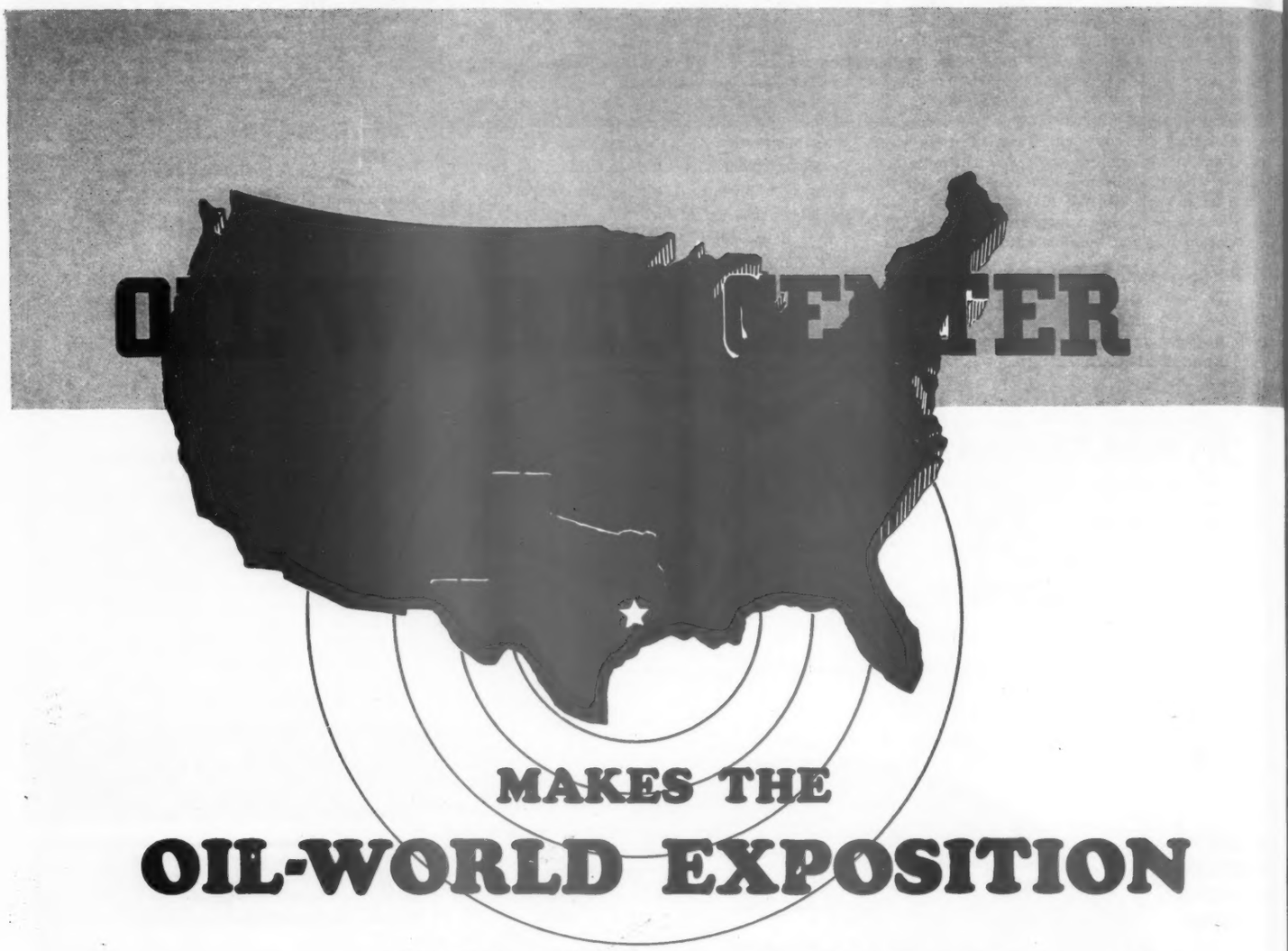

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Forced Draft Ventilator Used to Protect Welders From Fumes

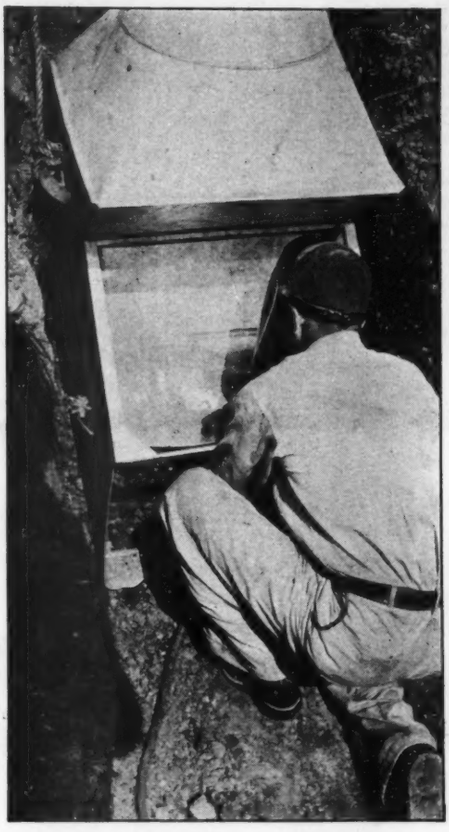
By PAUL REED

To safeguard welders against the injurious effects of the fumes produced during the welding of copper wire to pipe lines, a forced draft ventilator has been built for use on the 24-inch trunk line of the Northern Natural Gas Co. This has provided a satisfactory solution of a problem which has arisen in the course of installing copper bonds over bolted coupling joints when connections are being made with wind charger units.

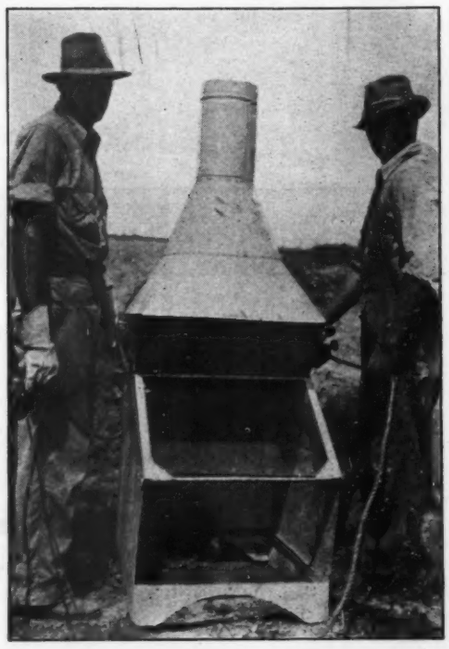
The ventilator is made of sheet metal with inexpensive construction. Essentially it consists of a funnel placed over the welding operation; draft furnished by a 12-inch electric fan, a size familiar in homes and offices, forces fumes up through the opening at the top; an opening at the bottom gives the welder access to the pipe; he watches the progress of the work through a pane of glass placed in a slanting position in one side of the ventilator.

The lower part of the ventilator is rectangular with base dimensions 30 by 24 inches; it is 35½ inches high. A round seating at the bottom fits over the pipe. The lower edge of the glass window is 17 inches from the bottom of the ventilator; the window slants at an angle of 45 degrees to a point 14 inches from the front side. The rectangular lower part is surmounted by a cone 17 inches high, on top of which is a cylindrival funned which is 8 inches in diameter and 13 inches high.

The electric fan is operated by a small D.C. electric generator unit, such as is used for lights on night jobs. This unit also furnishes power for a portable electric drill equipped with a steel buffer for cleaning the pipe surfaces where bonding is to be done. The electric generator unit is mounted on the front end of an arc welder machine that is moved along the line by a team of horses. This device was constructed by Ray V. (Whitey) Glenn, district foreman, Clifton, Kans. Information regarding it has been furnished by Steve R. Marshall, in charge of line maintenance for the Bushton, Kans., district.



Welder working with ventilator



Ventilator and cables for moving on line

Awards by Lincoln Foundation Include Petroleum Industry

The jury of award of the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, after judging thousands of papers submitted in the $200,000 award program, found that savings to industry by arc welding claimed by authors of papers aggregates $1,600,000,000. Altogether, 382 awards were made ranging from $101.75 for honorable mention to $13,941.33, the grand award.

G. M. STEARNS
Cities Service Oil Co.

In the oil industry, subjects of papers for which authors received awards were: Well-casings, reconditioning pipe lines in service, an oil pump motor base, bubble trays, well drilling, a coking-still shell, welding joints directly to drill pipe, new rotary machine, a wire line wall sampler, a production mast for well-servicing rotary hose coupling and an oil field slush pump.

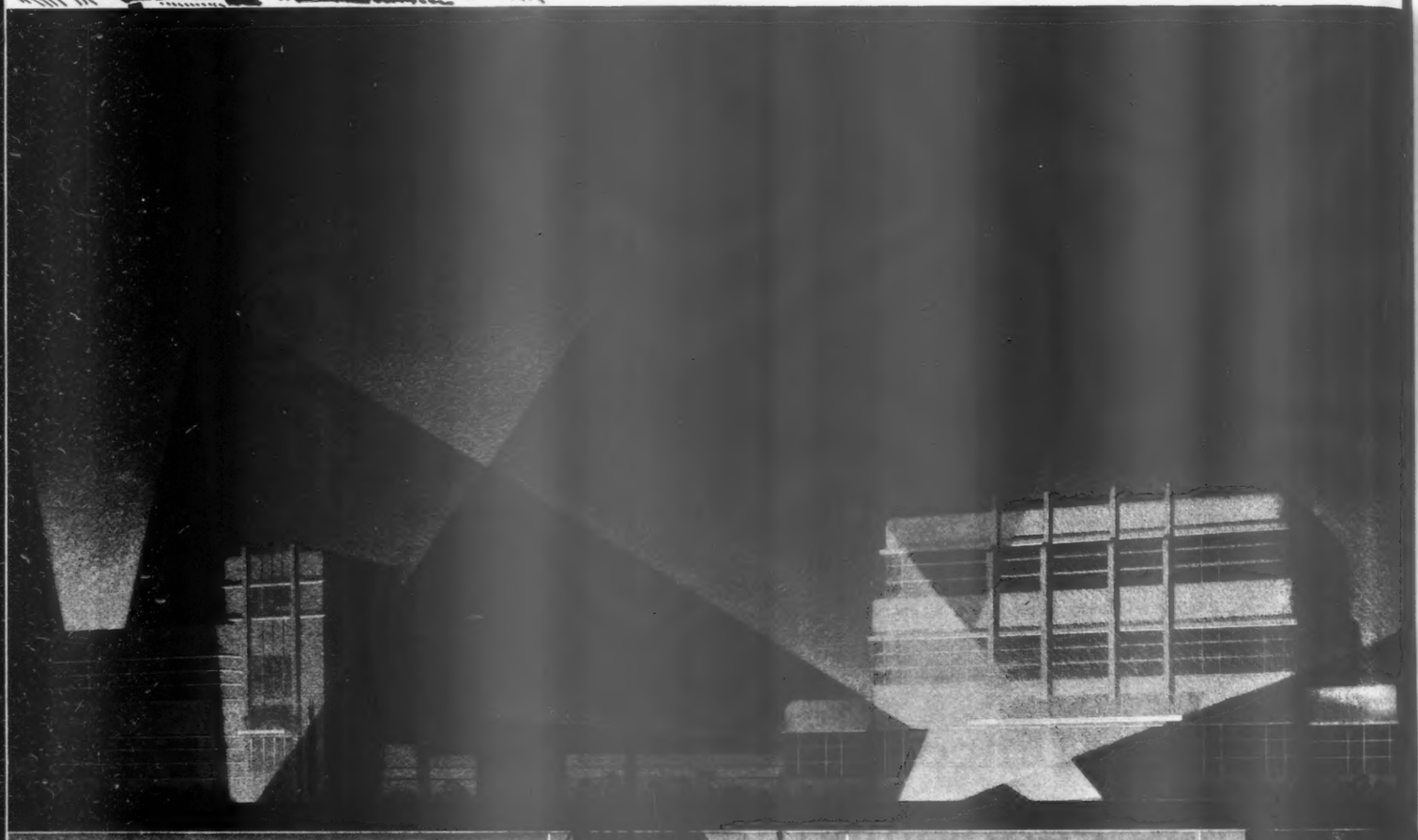
G. M. Stearns, district production engineer, Cities Service Oil Co., Russell, Kans., received the largest award for a paper from the oil industry, $2,543.88. His paper, "Arc-Welded Well-Casings," demonstrated that use of arc welding in running casing would have saved $637,000 for 5 per cent of the oil wells completed in the United States in 1937.

An award of $712.28 in the petroleum machinery division went jointly to John F. Muller and G. C. Munoz, power transmission engineer and general manager respectively, American Pulley Co., Philadelphia, Pa. Their paper, "Oil Pump Motor Base," indicated a possible gross saving to the industry of $16,000,000.

Award of $508.77 was received jointly by Phillip S. Ball and Justus O'Reilly, draftsman and assistant engineer respectively, Skelly Oil Co., El-

(Continued on Page 199)

KEEPING PACE WITH THE OIL INDUSTRY'S



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Each distinct division of Lane-Wells operation receives benefit and counsel from the others. Every product is bettered and improved wherever improvement is possible. This policy is also a pledge of better, more complete services to the oil industry throughout the world.

LANE-WELLS

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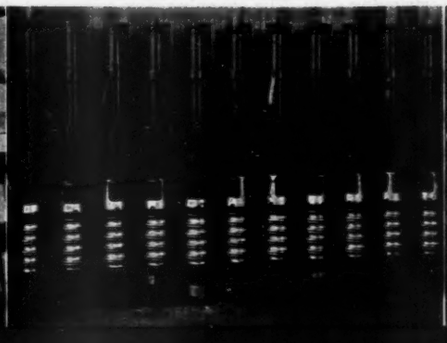
Since its organization, six years ago, Lane-Wells Company has had but one purpose—to provide the oil industry with specialized services and tools, *designed* to increase production or to lower production costs.

Oil well operators and Petroleum Engineers alike have recognized the value of these services, have accepted and made them standard practice in many fields. This acceptance has resulted in a phenomenal growth of the Company. The problems attendant to that growth have become increasingly important: For example, the training of men, the designing and building of equipment, the locating of branches and field offices—all of which could not be done over-night.

To keep pace with the ever increasing demand for Lane-Wells products and services, extensive equipment is essential. The resources necessary to provide such equipment have now been attained by the Company. Of as much importance is the employment by Lane-Wells of able executives and technicians, long-experienced in the petroleum industry.



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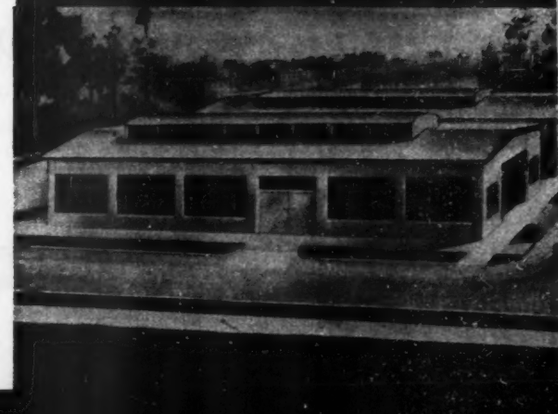

RECONDITION 30-MILE LINE

By D. H. Stormont

At the top is shown the locating of a buried line as the first step in the reconditioning project. Immediately below can be seen the stripping of the line in two views of one of the ditching machines equipped with a stripping shoe behind the buckets; stripping shoes remove soil from the upper part of the pipe. Next comes a view of pipe being cleaned on the skids to permit easier handling at the two central yards where the 20-foot joints are straightened and beveled with a torch

Exemplifying the progress made in reconditioning methods over the past few years, a 30-mile, 8-inch line near Beaumont, Tex., was recently taken up and relaid through use of some equipment entirely unknown just a few years ago. The line was first spotted with a radio pipe line finder; uncovered with a ditching machine equipped with a stripping shoe; thoroughly cleaned and reconditioned by up-to-date methods; and then, prior to being relaid, doped and wrapped entirely by a recently developed machine.

Work done on the line, owned by Magnolia Petroleum Co., consisted of reconditioning and relaying a loop from a point 1 mile east of Greyburg to the company's Hull station (15 miles); relaying of a line from Hull station west for a distance of 3½ miles; and from the Cleveland station west for 12 miles the old line was dug up, reconditioned and relaid. Work was started June 6 and completed on August 8.

Prior to taking up the line it was first spotted with a radio pipe line finder, after which it was stripped of the overlying dirt by two ditching machines, each equipped with a Jimmy Saunders' stripping shoe. The stripping shoe uncovered the pipe, removed dirt from over one-half of the circumference, and thereby allowed the pipe to be removed from the ditch without strain or any hazard of bending.

Two tractors equipped with sidebooms were used in raising the pipe from the ditch and placing it on skids. After sufficient length of line had been removed, a W-K-M cleaning machine equipped with all knives was used to clean the pipe of dirt and dope so it could be more easily handled at the central racks. After being cleaned the collars were split by means of an electric machine and an acetylene torch. The pipe was then picked up, each collar and joint separated and the pipe hauled to central racks. The cleaning yard on the Beaumont-Hull line was at Greyburg and the yard on the Cleveland loop at Fostoria.

At the central reconditioning yards, the pipe was racked and each end of the 20-foot joints beveled with a beveling machine. Prior to the beveling operation, however, all crooked pipe was run through a straightening machine. The pipe was then conveyed through a cleaning machine equipped with both knives and cutter wheels. After being cleaned in these machines the pipe was thoroughly examined and graded as to Nos. 1, 2, 3 or 4 pipe. It was then removed from the conveyors to respective piles of that particular class of pipe.

To further recondition the pipe, pit holes were pecked out with air and hand tools and spot welding done where necessary. The good pipe was then double-jointed, but that considered not worthy of putting back in the line was merely stacked and not double-jointed. The joints were hauled to the right

The cleaning machine, seen in the upper view, removes all dirt and dope. After inspection and grading, pit holes are pecked out with air and hand tools and spot welded; 20-foot lengths were double jointed as seen in the picture below. Next comes the relaying of the line by the stove pipe method; after this one of the two cleaning machines is shown in operation on the welded line before the inspection, bottom, then the pipe is ready for lowering into the hole

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Additional economies in the joining of pipe by the Lindeweld Process now are obtainable by using the new Oxweld 6-Flame Tip for making rolling welds—and the new Oxweld 4-Flame Tip for position welds—with the new, high-speed Oxweld No. 32 C.M.S. Steel Welding Rod.

Rolling welds in pipe now can be made 35 to 70 per cent faster than was previously possible with multi-flame welding. Position welds can be made at least 25 per cent faster. Stronger and tougher welds of uniformly high quality can be produced—and savings of 20 per cent or more in oxygen and acetylene consumption can be realized.

Full information about these new products for use with the Lindeweld Process of permanently joining pipe by the oxy-acetylene flame is available in the booklet, "Speeding the Construction of Overland Pipe Lines." A copy will be sent you on request.

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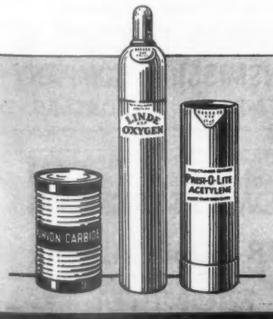

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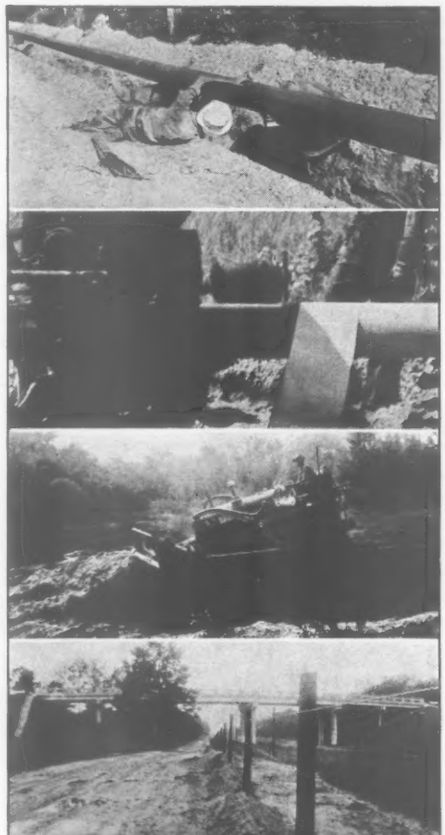
of way where it was restrung for relaying. The trench dug in taking up the line had been backfilled so the reconditioned pipe was strung along a new ditch.

The new line was laid by the stove-pipe method, using two 200-ampere electric welding machines for tacking and five 300-ampere machines for making the bell hole welds. All machines were mounted on trailers and conveyed from point to point by



The men in the uppermost photograph, under the pipe are picking out pits with hand tools before the spot welding which precedes applying primer coat. Then comes the machine which dopes and wraps at the rate of 40 feet per minute. Next is shown a bulldozer backfilling the ditch. Debris was cleaned from the right of way and all fences, torn down in the course of construction, were rebuilt; thus the job was finished

two tractors. Following conventional practices used with the stove-pipe method, the centralized crew lined up the pipe and arc-welded the joints in position welds instead of the usual roll-weld made in the firing line method. The pipe was lined up on skids high enough aboveground to permit making the weld entirely around the pipe with the pipe held stationary. Each joint was tack-welded as the pipe was lined up, following which the joint was position or finish welded.

After the line had been welded and placed in position over the ditch it was cleaned again. The pipe was thoroughly soaked with kerosene and, first, a machine, equipped with one row of knives and the balance of the header with brushes, ran over the line. This was followed by another W-K-M machine equipped with all brushes, the pipe then being soaked with gasoline. After this procedure the pipe was again hand-packed and primed.

The protective coating was applied with the new J-M combination coating and wrapping machine, this being the first line upon which it was

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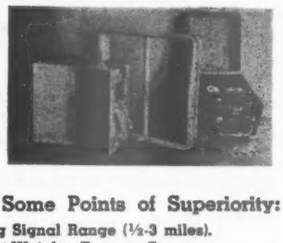

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used. As is shown in the accompanying photograph, the machine is self-propelled and of the hopper type with a drip pan below the line. The dope flows from the hopper down over the line and into the drip pan where it is picked up by a rotary pump and pumped back into the hopper. A shoe fitted on the bottom of the pipe insures a uniform thickness of coating to specification requirements. On this line the machine wrapped J-M asbestos felt with one head and kraft paper with the other.

The machine did an excellent job of applying the protective coating and a like job of wrapping the felt and paper. In addition, quite a saving in dope material, felt and paper, as well as time, was realized by its use. The machine is capable of doping and wrapping about 80 feet per minute of 8-inch line, but on this job it was slowed down to about 40 feet per minute. It was developed for Johns-Manville by J. D. Cummings of Crutcher-Rolfs-Cummings.

After the line had been doped and wrapped it was lowered into the ditch and back-filled, with the exception of loops held up at intervals for slack. These loops were held up into the cool of morning when they were lowered into the ditch and back-filled. All abrasions occasioned from the pipe being left on skids were patched before the loops were lowered. The right of way was cleaned of all debris, after which any fences that had been torn down were repaired. The reconditioning work was done by W. G. Hanrahan, pipe line contractor of Dallas, Tex., and the hauling done by Joe B Hodges.

Foundation Awards

(Continued from Page 193)

dorado, Kans. Their paper was "Arc-Welded Trays for High-Pressure Bubble Tower."

Award of $305.26 went jointly to S. William Riley and George Heinish, design engineer and chief engineer respectively, Star Drilling Machine Co., Akron, Ohio. The paper, "Arc-Welding Advances the Art of Well Drilling," shows weight reduction of 13,000 pounds by arc-welded construction on a portable spudder drill, ability to use heavier tools and operate with less power, longer life, greater safety.

Award of $203.51 went to A. M. Elder, engineer maintenance department, Gulf Refining Co., Toledo, Ohio, for his paper "Redesign of Coking-Still Shell for Arc-Welding." The paper shows a saving of $109,350 per year available by improved design with welding.

Award of $152.63 went jointly to G. W. Woods and R. S. Grant, engineers, Hughes Tool Co., Houston, Tex. A saving of $3,000,000 annually to the oil industry was shown available by their paper "Arc-Welding Tool Joints Directly to Drill Pipe."

Honorable Mention

Honorable mention awards of $101.75 went to the following authors of papers on design of oil industry equipment: Fred C. King, Jr., draftsman, National Supply Co., Torrance, Calif.; L. W. Mosley, owner, Baker Oil Co., Huntington Park, Calif.; R. H. Biggs, Midland, Tex.; Joseph W. Gasper, designer, Maine Machine Works, Ltd., Gardena, Calif.; jointly to W. C. Russell and L. W. Stahl, superintendent structural division, and chief engineer, mechanical division, Emsco Derrick & Equipment Co., Los Angeles, and R. E. Hughes, district foreman, Standard Oil Co. of Louisiana, Oxford, La.

The grand award of the program went to Mr. and Mrs. A. E. Gibson, president and stockholder, respectively, of Wellman Engineering Co., Cleveland, Ohio. The authors jointly received $13,941.33. Their paper was a treatise on the elements required to assure the business and technical success of all users of welding throughout industry.

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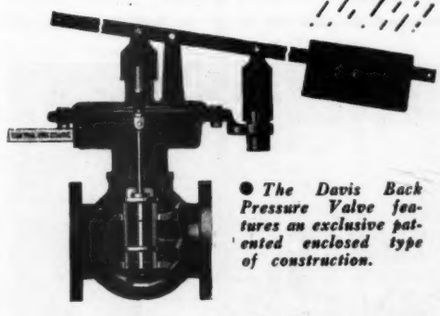

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Construction of Continental Line in Wyoming, Colorado

Sections tied in before lowering in ditch

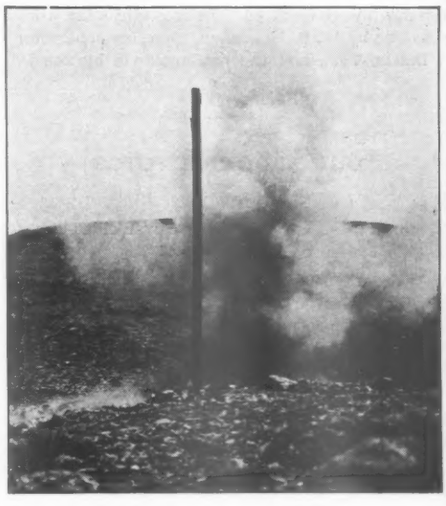
Contracts have been let for the construction of the line from Lance Creek to Glenrock, Wyo., where Continental operates a refinery. In this section Osage Construction Co. will construct 50 miles of 4½-inch line, while Gorden Contracting Co. of Denver will construct 15 miles of 6-inch. All of this line will be coated, using a hot bestos wrapper applied by machine. All joints will be electric welded. Work on this section has not started, as the contracts have just been consummated.

Bulldozer clearing right of way

On the section of line from Lance Creek to Cheyenne, which will consist of 135 miles of 8-inch. 20 miles of line has been laid and 40 miles of ditch has been completed. This section is being constructed by S. D. Bechtel, Inc., of San Francisco, with H. C. Price, Inc., of Bartlesville, Okla., contracting all of the welding. Solid welding is being used without expansion joints, since there are many overbends and underbends. Long sections of pipe are made up over the trench, consisting of six or seven joints, and these sections are welded in place with a position weld in a bell hole.

Ninety miles of the section being constructed by the Bechtel firm will be wrapped using a hot application of NO-OX-ID and NO-OX-ID-IZED asbestos wrapper applied by machine. There are many river and stream crossings on the line, the largest of which is the North Platte River (just east of Guernsey, Wyo.) where the water is fairly high and there is approximately 400 feet of water to cross at the selected crossing location. Single lines will be used on all river and stream crossings, which will be fitted with river clamps and buried several feet deep in the river bed. Barges will not be required for this river work.

Elevation at Lance Creek is 4,100 feet, while it is 4,965 feet at Glenrock. From Lance Creek the line will rise to an elevation of 6,082 feet before it descends into the North Platte River Valley. From the North Platte to Cheyenne is a fairly level plateau rising on a steady though punctuated incline from 4,375 feet to 6,145 feet. Near Chugwater over a mile of solid rock which must be blasted to form the ditch. There are many smaller stream crossings on this section of the line, including the Laramie River, Bear Creek, Little Bear Creek. Horse Creek and Lodgepole Creek. Soil tests are now being made on this section by the Corfield method to determine the number of miles of wrapping to be used. Originally it was planned to use 28 miles of single wrapping with asphalt, but as the Corfield tests have progressed, more and more mileage to be wrapped has been included.



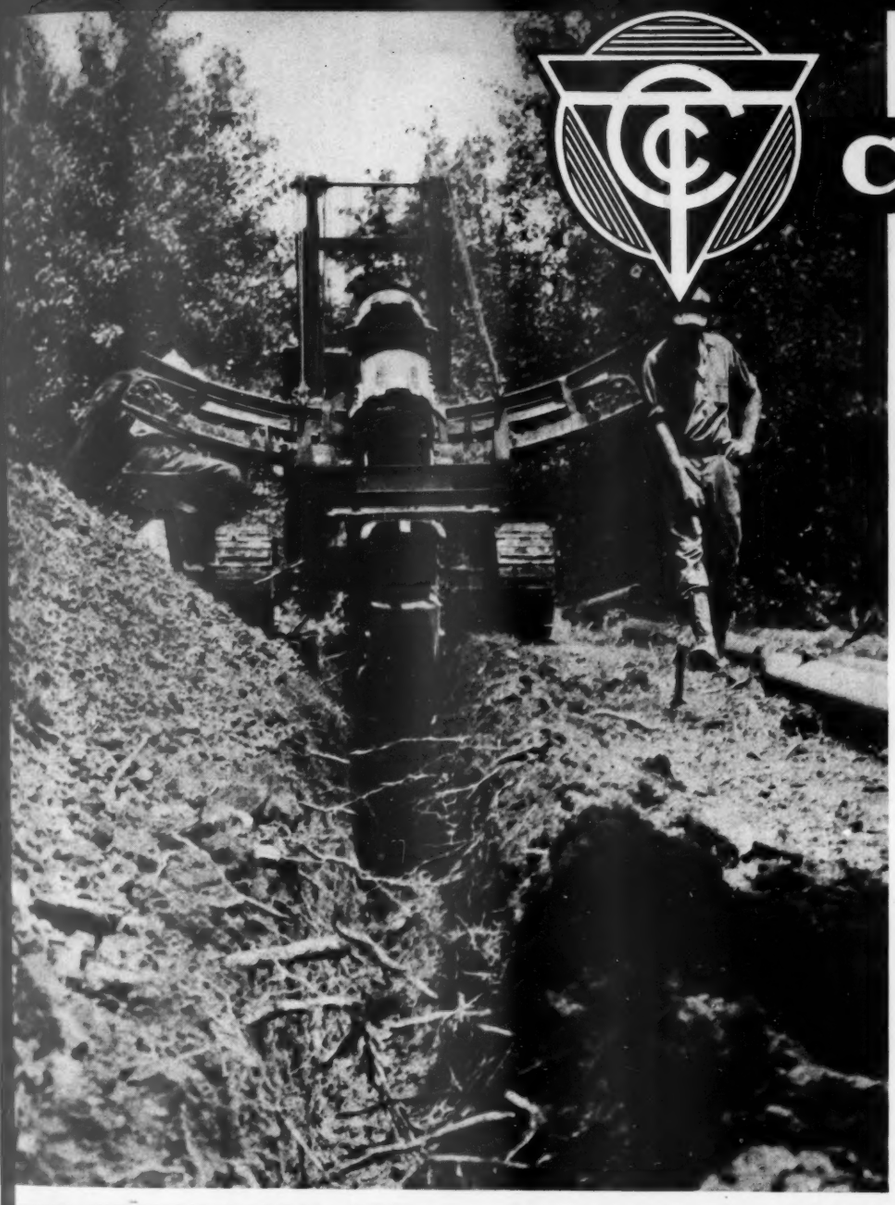
Blasting rock in ditch

The section of the line running from Cheyenne to Denver, a distance of 92 miles, is under contract by Osage Construction Co. This company is doing its own electric welding, and the entire section will be wrapped, using the same method as on the other two sections. This section is made up of 6-inch pipe, since Continental operates a refinery at Cheyenne where some of the Lance Creek oil will be refined. One-half of the construction work on the Cheyenne-Denver section has been completed by the contractors.

All of the line will be constructed in open country between Lance Creek and Cheyenne, but 60 per cent of this section is in fairly rugged topography due to many small creeks. Near the Platte River crossing a 5-mile stretch of rock will require considerable blasting. The entire line (all sections) will be buried 2 feet deep and all sections will be electric welded.

Three pump stations will be installed on the system by company forces. One of these will be at Lance Creek and will pump oil in two directions, that is, both to Glenrock and to Cheyenne. Completion of the system is expected shortly after November 1.

Wrapping machine operating in rough country



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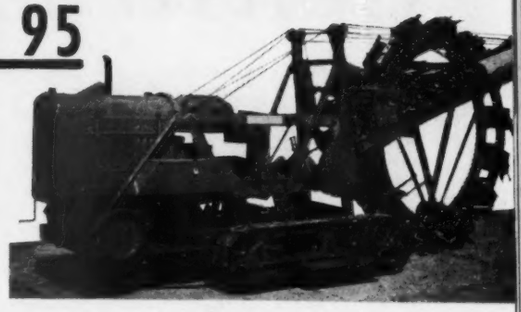

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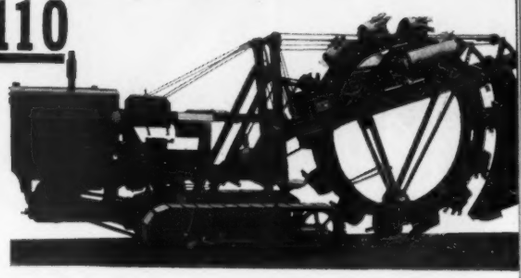

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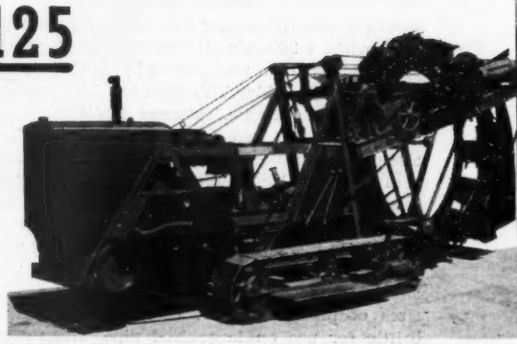

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This new member of the "Cleveland" family—THE CLEVELAND MODEL 90 PIPE-CRANE and BACKFILLER lays pipe, backfills ditch, loads and unloads pipe, "snakes in" loads by winch or draw-bar.

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Among the many exclusive features of the Cleveland Model 90 is *one-man continuous operation in either direction* at backfilling speeds up to 52 feet per minute and at travel speeds up to 5½ miles per hour. Be sure you get the details about this machine.

All Cleveland machines are quickly and easily transported at truck speed on their own special-built trailers. Load or unload in 10 to 15 minutes.

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ELECTRIC WELDING OF PIPE LINES

By T. P. Sanders

Firing line on construction of Panhandle Eastern system

Electric welding was used for the first time on a long pipe line in September, 1928, when a 200-mile oil line from St. Augustine to Corsicana, Tex., was welded by H. C. Price Co. of Bartlesville, Okla. This firm had been engaged in electric welding of storage tanks for about seven years, but had not deemed it advisable to attempt application of the practice to pipe lines.

The early electric pipe-line welds were made using bare or uncoated welding rods with a current of not more than 300 amperes at 25 volts. Even with this equipment, welders working without benefit of previous pipe line experience were able to make satisfactory welds on the smaller sizes of pipe. However, these welds were too brittle for use on large-sized pipe where there were decided changes in temperature. In 1929 a 12-inch oil line was welded from Oklahoma to Chicago, a distance of 600 miles. Results were not encouraging, as 45 of the brittle joints broke during the first winter.

The heavily-coated or shielded-arc electrode became available in 1930 and immediately brought about more ductile and more efficient welds. Coated rods have been constantly improved during the ensuing eight years so that now a homogeneous weld is practically assured. Higher currents were necessitated by the coated rods, and machines were adopted having a constant capacity of 400 to 600 amperes at 40 volts. Today these machines are often operated by Diesel engines in the interest of economy.

Bell and spigot joints were used on all early electric-welded lines, but the double-bell joint with backing-up ring soon appeared. An important advancement in technique was made in 1933 when plain-end pipe was used for the first time on a long line without backing-up rings. Prior to this time it had been the general belief that the fluidity of the electric weld metal made some kind of backing-up ring mandatory. The heavy rings in use at this time were objectionable when used in plain-end pipe because they offered resistance to flow by restricting the inside diameter.

In order to make contacting of plain-end pipe possible on oil lines where backing-up rings were prohibited, the H. C. Price Co. devised a removable backing-up ring. This was made of copper, theoretically to prevent the weld metal from sticking to it. It was placed inside the joint to be welded, and after the weld was completed it was collapsed and withdrawn by manipulation of rods projecting through one of the joints of pipe. This operation was carried on satisfactorily during shop tests.

Upon the strength of the copper backing-up ring a contract was obtained by the Price company for welding 200 miles of 8-inch plain-end pipe for a gasoline line in Kansas on which permanent backing-up rings were prohibited. A major crisis arose when it was found that the collapsible ring was a failure in field practice. True enough, the copper did not stick to the weld when the pipe ends were butted against one another, but this condition could not always be brought about in the field. In most cases it was found when the joint was completed that the collapsible ring was stuck to the weld and could not be removed by the method prescribed.

Perhaps if this precarious situation had not arisen for the contractor it would have been several years before electric welding of plain-end pipe without backing-up rings was developed. The possibility was not given serious consideration for the first few days while means of fulfilling the terms of the contract were being discussed. Then a welder asked for and obtained permission to attempt a joint without a ring. Through cooperation of the general contractor, Kelly-Dempsey Co., and the line owner, Phillips Petroleum Co., success followed. The collapsible rings were discarded, and the line was completed to the satisfaction of all with a new-type joint which has since come into general use on oil and gasoline lines and on gas lines of diameter less than 10 inches.

Top: Modern equipment includes a 400-ampere welding unit mounted on a truck. Bottom: Old method was a 200-ampere welding unit without gasoline tank mounted on horse-drawn wagon

Backing-up rings are still used on larger-sized pipe but their thickness has been reduced almost one-half so that they offer little resistance to flow. Where their use is not rejected they offer advantages because the welding is made more foolproof and only two beads around the joint are required whereas their elimination necessitates three beads.

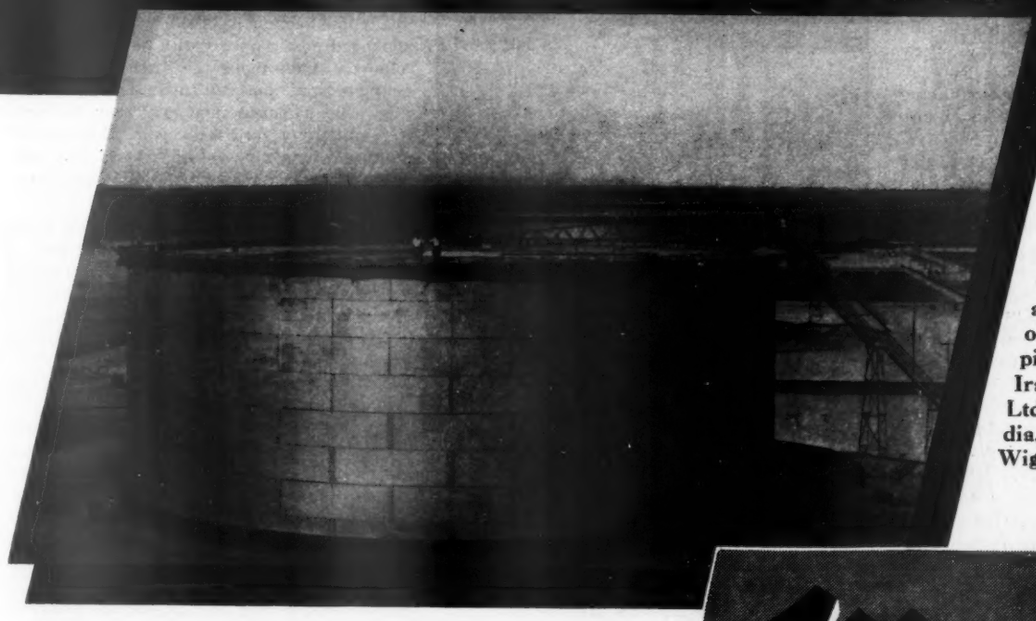
Some electric welded lines are of the composite type. That is, every other joint is made up with a coupling while those in between are welded. The couplings usually make the line more flexible, which is often considered a helpful characteristic in overcoming shocks and forces of contraction and expansion. However, solid welded lines have been used extensively in California and in the East. With this type of construction, expansion and contraction are taken care of by the overbends, underbends, and curves.

Electric welding received a severe test in 1936 when Hope Natural Gas Co.'s 93 miles of 12-inch was constructed in the roughest mountains of West Virginia. This line was built for an operating pressure of 1,400 to 1,500 pounds, the highest gas transmission pressure in use. The solid electric-welding method was used; H. C. Price Co. contracting all joints. Results were entirely satisfactory, but due to the roughness of the country a new method of handling pipe was adopted which has since proved very useful elsewhere.

Before 1936 solid-welding practice always called for making up the pipe into 200-foot sections and tying these sections into the completed line with a bell hole or position weld. This practice proved impractical in the mountains because handling of long sections was too difficult. The stovepipe method was adopted instead, by which the joints are handled individually and welded onto the line one at a time. This method, developed through necessity, has since proved to be the most economical method for welding large-sized pipe in rough or muddy country and for welding small-sized pipe in any type of country.

A recent change made in moving of equipment by the Price company has brought about faster operation. Instead of transporting equipment in the same manner under all conditions, the mode of moving is adapted to the topography. In rough or muddy country the welding machines are drawn by tractors, but under ordinary conditions each unit is mounted on a truck to obtain greater speed.

To date over 7,000 miles of pipe line have been welded by the Price company alone. This extends over 19 states and includes all or parts of such prominent systems as the large natural gas lines from the Texas Panhandle to Chicago; the Keystone pipe line system in Pennsylvania; the Godfrey L. Cabot gas lines in West Virginia, Pennsylvania, and New York, and the Southern Fuel and Pacific Gas & Electric in California.



IRAQ

THESE pictures were taken near Haifa, Palestine, at the Sand Dunes terminal of the internationally known pipe line operated by the Iraq Petroleum Company Ltd. More than twenty 120 ft. dia. tanks are equipped with Wiggins Pontoon Roofs.

Modern Tanks...

YEAR by year as the value of petroleum resources becomes more keenly appreciated, oil companies everywhere have found it increasingly profitable to adopt methods and equipment that foster conservation. Because they are specifically designed to prevent evaporation losses, Horton oil storage tanks have figured prominently in this move towards greater efficiency. Today, in the Horton line, you can find modern tanks to meet every need. These include Wiggins Pontoon Roof tanks, Wiggins Breather Roof tanks, Wiggins Balloon Roof tanks, Hortonspheres, and Hortonspheroids. For information, address our nearest office.

Reconditioning Operations of Pipe Lines Are Reviewed

By W. MIKE MURPHY
Air Reduction Sales Co.

There is in useful operation in the oil and gas industry of the United States approximately 200,000 miles of pipe lines of 4-inch and larger diameter, representing a total investment of considerably more than $1,000,000,000. It can now be said that with properly scheduled reconditioning programs and with recently developed applications of welding, these lines may be kept in continuous operation into eternity. Oil lines may be returned to original strength and efficiency without interruption of full load operations. Gas lines can be maintained in full operating efficiency and without shutdown by taking advantage of short periods of low delivery representing only a few hours.

The average expected life of buried steel pipe lines without replacement or repair is something less than 30 years. Operating in extreme conditions of soil and climate, the useful life of these lines is comparatively brief. There is no accurate method of predicting the effect of varying soil conditions on the life of steel pipe or of predetermining the point at which failure will occur. Failure of a single joint may cause expensive shutdown of an entire system and result in serious property damage. The best insurance for continuous efficient operation is complete reconditioning at regularly scheduled intervals and before the pipe is damaged beyond reconditioning repair.

Reconditioning schedules will vary with operating conditions of each pipe line system and should be based on periodical inspection and observation of the lines in the system. Assuming an average life of 30 years, efficient reconditioning should be scheduled each 20 years.

Since the cost of construction of pipe lines represents only one-sixth of the total cost of the lines, a great saving is to be gained by adoption of reconditioning programs to maintain the lines in efficient operating condition and thus avoid the necessity of pipe replacement. A further saving is to be gained by scheduling reconditioning before losses are suffered through leakage and soil contamination and other property damage produced from pipe line leaks.

Reconditioning large-diameter gas line in Mississippi

Trimming and beveling damaged pipe end in reconditioning yard

Schedule Repairs

To insure uninterrupted and efficient operation, it would result in economy to schedule complete reconditioning of equal parts of pipe line systems each year so that the entire system will have been reconditioned and returned to original strength and efficiency each 20 years. With such a plan, scheduled well in advance, advantage may be taken of reduced loads on the lines and of favorable weather conditions for reconditioning work.

Particularly on natural gas lines, the reconditioning of sections of the systems each year will work out to advantage. An additional line of equal capacity may be laid parallel to and near the operating line between sectional main line gate valves, using either new or reconditioned pipe.

Taking advantage of a period of low delivery, this parallel line may be put into service and the older section removed from service with a quick operation of changing connections at the gate valves at each end of the section. The older line may then be taken up and moved into a reconditioning yard where cleaning, culling, and repair of the old pipe may be done leisurely and provide work throughout the year for regular maintenance crews when not otherwise employed. This plan of reconditioning will justify the regular employment of qualified welding operators in maintenance crews and permit carrying of larger crews through the winter when they may be found useful to take care of emergencies.

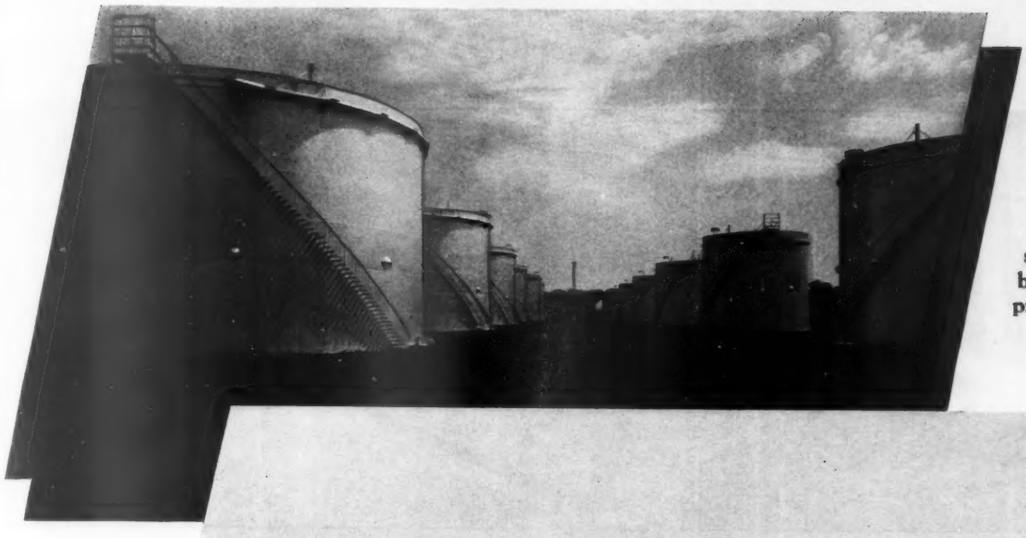
An optional method of reconditioning gas lines may be used in extended periods of low delivery. A temporary by-pass line of smaller diameter may be laid on top the ground and connected to blow-off lines at sectional gate valves to permit continuous operation at lower capacity while the main line section is taken out of service, raised, damaged pipe replaced with new or reconditioned pipe on skids above the ditch, the line cleaned and recoated and returned to its original position. The damaged pipe may then be hauled to reconditioning yard for repair. This method will require a longer period of reduced load and completion by a larger temporarily recruited reconditioning gang.

Where reconditioning is scheduled before serious damage to a line, a very small part of the pipe will be damaged beyond welding repair and require replacement. After a thorough cleaning in the pipe yard, a major part of corroded pipe may be returned to original wall thickness by spot welding of corroded pits. Where the pipe wall has been completely penetrated by corrosion, it is usually only through a small part of the total length of the pipe joint and this may be removed by a circumferential cut with a beveling machine on each side of the peneration and the two undamaged parts returned to a useful length of pipe by a circumferential weld. In most cases pup joints as short as 30 inches may be profitably welded together to make useful joints.

It is false economy to wait until lines show heavy leakage and serious damage before reconditioning of oil lines. If properly scheduled, complete reconditioning of oil lines may be done without reduction of pressure on the lines or interference with full load operation. If the recon-

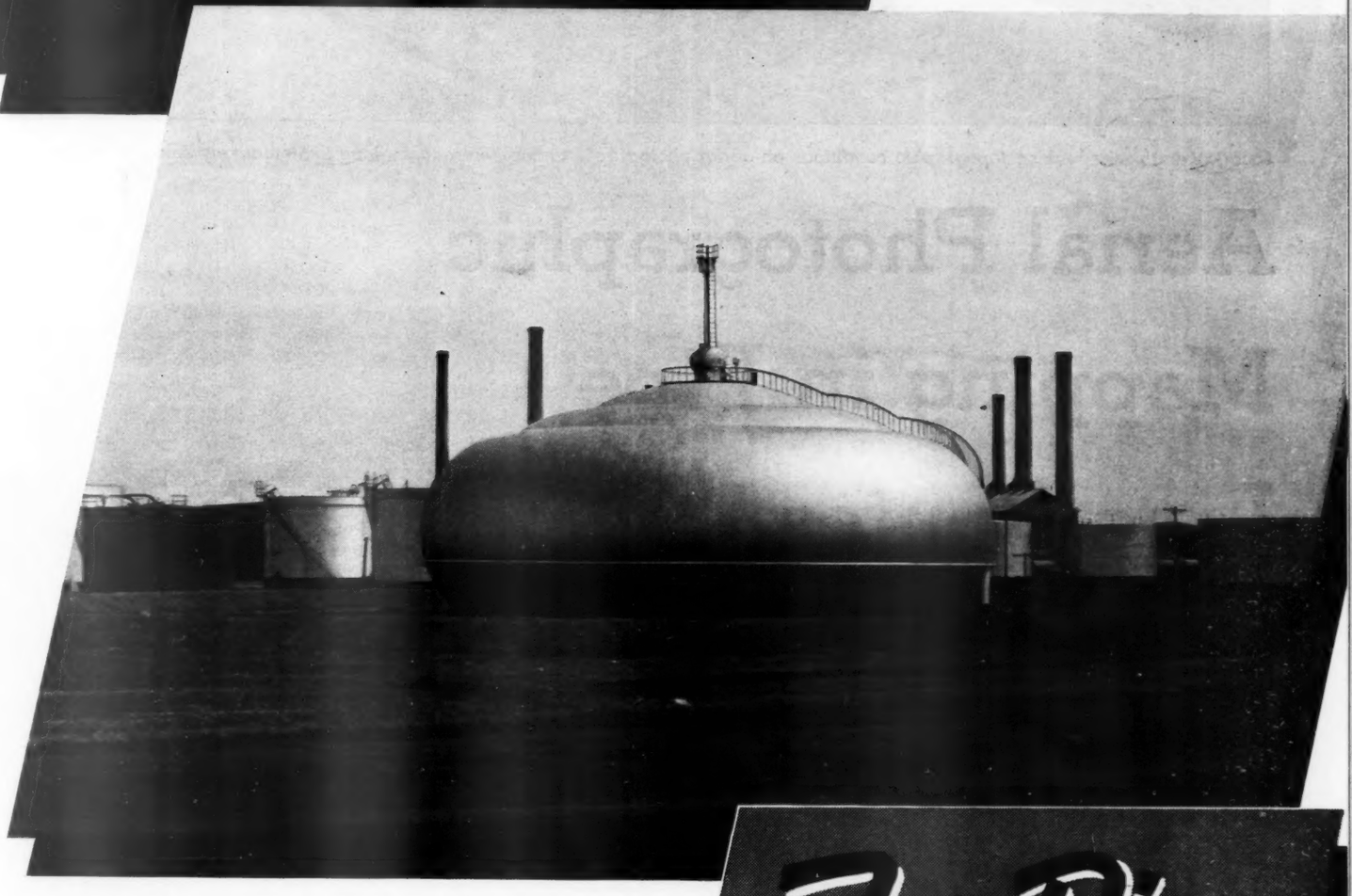
(Continued on Page 209)

Completed half-sole. Pits now being spot-welded



WHITE EAGLE

THESE pictures show installations of Wiggins Pontoon Roof tanks and Hortonspheroids on the White Eagle Pipe Line. The tanks at the left are located at Kansas City, Kansas—the last one in the right row being a 10,000-bbl. Hortonspheroid. Below is a new 80,000-bbl. Hortonspheroid for 10 lbs. pressure at Augusta, Kansas.



For Pipe Lines

WIGGINS Pontoon Roof tanks and Hortonspheroids are particularly favored by many companies for pipe line service. Wiggins Pontoon Roofs are recommended for working tanks that are filled and emptied at frequent intervals. These roofs float directly on the surface of the liquid. Vapor space inside the tank is eliminated, thereby preventing breathing and pumping losses and greatly reducing fire hazard. The Hortonspheroid is used for storage of natural gasoline at pressures up to 25 lbs. per sq. in. and is also finding much use for storage of quality motor fuels at low pressures. We will be glad to give you complete information.

Location engineer checking topographic conditions on aerial photographs under stereoscope along the tentatively selected section of line

Aerial Photographic Mapping in Pipe Line Routes

By JAMES ATKINSON
Edgar Tobin Aerial Surveys

The essence of the problem to the pipe line location engineer is of course to find a route between the points to be connected which will enable the cheapest and quickest construction and make for the most efficient operation after the line is in the ground. Such a route would rarely, if ever, follow a straight line; for conditions of topography, drainage, and right of way that a straight line would disregard might easily make it the most difficult and expensive to build—and likewise the most expensive for carrying.

On the other hand, an unnecessarily circuitous route, seeking in all cases to avoid terrain difficulties, would likewise defeat the principles of economy. The degree of success in answering the location problem depends on the nature and extent of the information available to the location engineer as to the terrain within whose limits the pipe line is to take its course, and the cost of getting this information.

In older times pipe line routes were necessarily worked out by information obtained by ground survey methods, which at their thoroughgoing best could give only a limited account of the many land features great or small bearing on the location problem. And in country unusually rough, or densely patterned with drainage, the choice of a route by ground reconnaissance even with the help, when available, of the best topographic maps made by ground survey methods, became a highly complicated process of trail and error, with resultant waste of time and money from multiplied backtracking, and with the route ultimately staked without benefit of all the advantageous possibilities which the terrain offered. Many pipe lines built years ago and still in the ground climb and descend rises, cross streams, pass through wooded areas or across high-cost right of way which might in many instances have been avoided without undue mileage increase, if the complete record of the terrain details had been at the disposal of the location engineer.

Value of Surveys Recognized

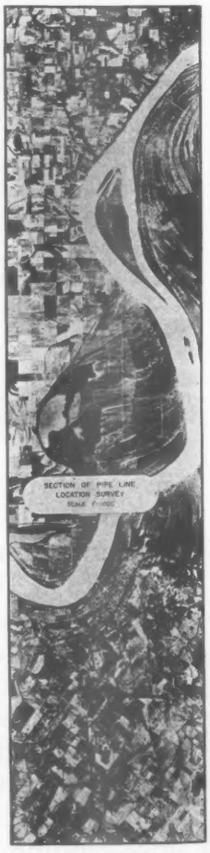
Aerial photographic mapping was first tried on a major pipe line construction project in this country about 10 years ago. This was on the Texas Pipeline Co. line from Yates pool, Texas, to Port Arthur—much of which crosses extremely rough and totally unmapped country. B. E. Hull, of Texas Pipeline Co., already familiar with the utility of the airplane in other phases of the oil business, conceived and executed the idea of the aerial photographic survey as a means of reducing or eliminating the handicap of inadequate land surface information besetting the location work, and of subsequently facilitating the construction of the line itself. This experiment was notably successful giving results that far exceeded expectations.

In the years since, many thousand miles of pipe line have been laid on numerous projects, and aerial photographic surveys of the country along the proposed routes has practically become standard equipment. The company with which the writer is associated has alone made such aerial photographic surveys of some 7,000 lineal miles, with an area coverage of some 25,000 square miles.

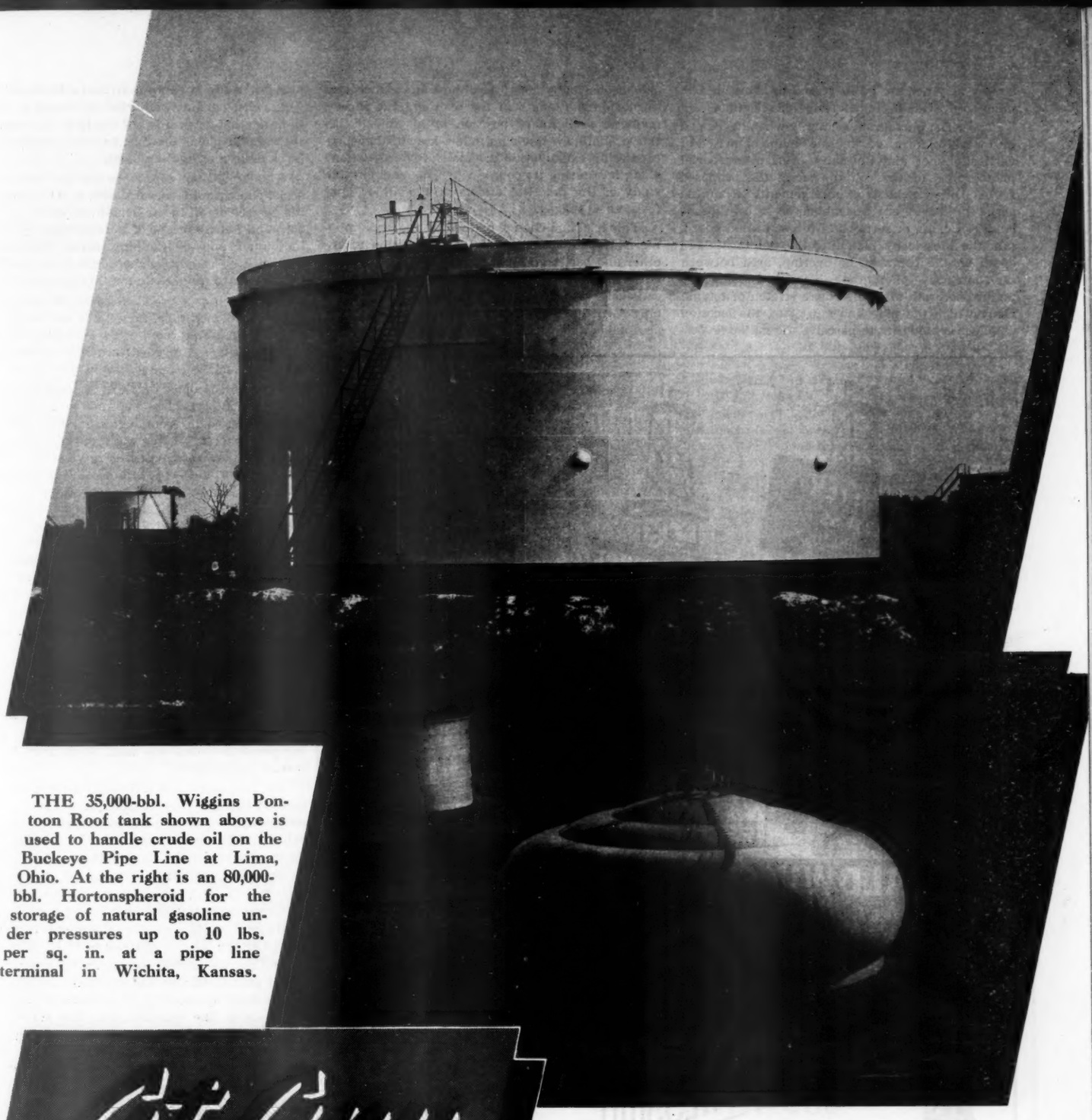
The value of the aerial photographic survey in pipe line location work will be largely self-evident to those with even a general acquaintance with this mapping method. It presents, with the faithfulness possible only to the camera, a picture complete to the smallest visible surface detail of the country across which the line must run. The aerial map itself provides the horizontal working base for the route, and examination by stereoscope accurately reveals the details of elevation change, or relief. Hence the location engineer is fully equipped at the start to lay out the very best route, from all considerations, which the terrain will permit. He is able to take advantage of every favorable condition; and on the other hand, to avoid natural obstructions with the least possible vertical or horizontal deflection from a straight line between the terminal points, and with the minimum increase in overall distance.

By a procedure to be briefly described further on, the pipe line location across average country may be plotted in the office with assurance of little if any necessity for change when staked on the ground. Or, in extremely rough country, alternate routes may be plotted on the aerial photographic map, with decision as to the one ultimately adopted subject to a one-party ground check. This contrasts strongly with the amount of work and time involved when a rough country route was worked out altogether on ground, and perhaps half a dozen separate survey parties would be placed in the field to search the possibilities of as many different possible routes.

In average country the aerial photographic survey along the general line of the proposed pipe line need only be about 3 miles wide, where the country is rugged, marshy, heavily wooded, thickly populated, or presenting a complex drainage network, the width of the



Section of typical aerial photographic mosaic map for pipe line location. Area covered is approximately 25 miles long and 5 miles wide



THE 35,000-bbl. Wiggins Pontoon Roof tank shown above is used to handle crude oil on the Buckeye Pipe Line at Lima, Ohio. At the right is an 80,000-bbl. Hortonspheroid for the storage of natural gasoline under pressures up to 10 lbs. per sq. in. at a pipe line terminal in Wichita, Kansas.

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survey may need to be increased to as much as 8 miles to provide a greater range of selection.

The aerial photographic survey when developed into working form is a "mosaic" map comprised of vertically shot and mutually overlapping aerial photographs of the country along the proposed route. Direct prints, or enlargements, from the aerial negatives are assembled on a continuous length of cloth, or sections of pressed wood board, into the mosaic by matching the points of land detail on the common, or overlap, area between the consecutive photographs. With this composite picture before him of the entire stretch of terrain along which the pipe line must run, the location engineer is able first to perceive the major favorable or obstructive features almost at a glance, and to plot on the length of the photographic survey map the preliminary position of his line. With this preliminary line as a guide, he will then proceed to an examination in detail of short sections along it, altering its course when his comparative study of the practical effects of the minor land features so suggest.

This trial and change method on the aerial photographic map continues from one section to another and back and forth on the over-all until the entire preliminary line has been brought to more satisfactory position. This second line is, however, only a further approach to the final route, being acceptable only as a "plan," in the horizontal plane—the alignment thus arrived at being still subject to check against conditions of elevation change in order that a "profile" of the line—its course in the vertical plane—may be as close as possible to level, or to a normal gradient.

This final step cannot be carried out on the aerial photographic mosaic itself, which shows only the surface detail in the horizontal plane; but it is accomplished by means of stereoscope study of the individual and overlapping aerial photographs comprising the mosaic map, which are provided in addition to the mosaic for this purpose.

The stereoscope used is in principle the same as the old-fashioned type, familiar to all, which used to grace the living room or parlor table; but modified and adapted for the third-dimensional observation of aerial map photographs.

The stereoscopic, or third-dimensional effect, requires photographs of the same group of objects made from two different angles, and this is brought about on aerial photographs of ground objects when they are so exposed as to yield the overlap already mentioned—the ground objects common to the overlap area on any two overlapping photographs will have been taken from the airplane at different positions above the ground, thus meeting the different-angle requirement. Since the photographs are normally caused to overlap each other better than 50 per cent, the result is that every ground feature caught by the camera may be seen in relief.

Under the stereoscope, the preliminary or revised pipe line location plotted on the aerial photographic map base is examined over the entire length to eliminate excessive grades which may be practicably circumvented by deflection. In rugged areas, though all choices may be poor, the best one can eventually be worked out because every existing possibility that the land offers may be discerned and utilized.

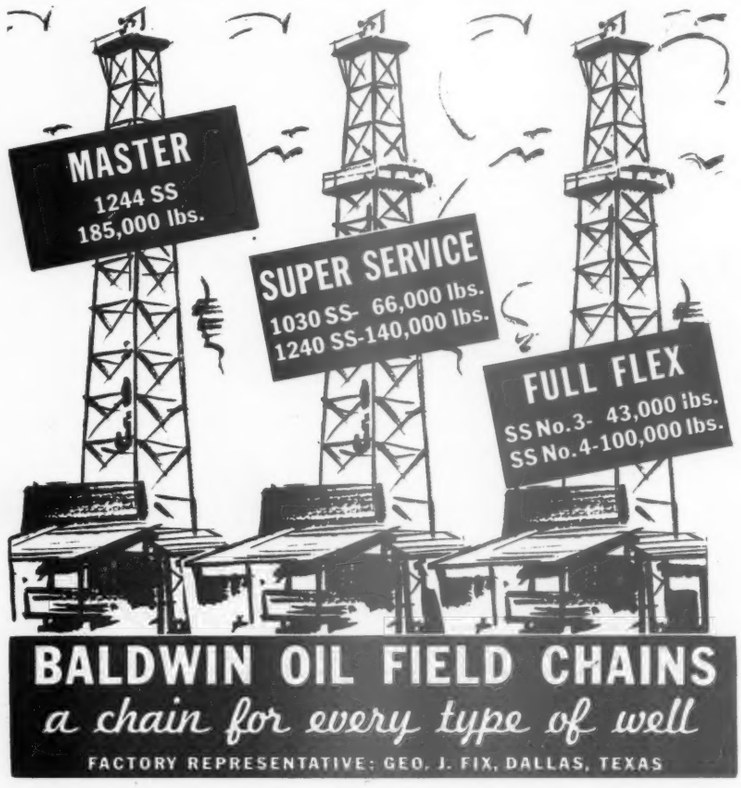
The line location as ultimately arrived at by the method outlined may be adopted as final, subject only to such inconsequential changes as may be called for by minor local conditions encountered on the ground by the staking party.

The line so plotted on the aerial photographic map may be staked on the ground altogether by reference to the photographic detail; a preliminary instrument survey of the alignment is not required either for this purpose or to lay pipe.

During the actual construction process, the aerial map facilitates and expedites many phases of the work by showing all available means of access to the line location from the surrounding country, thus providing the means for greatest efficiency in transport of materials, disposition and movement of construction gangs, and so on.

Another prime advantage resulting from use of aerial photographic surveys on pipe line projects lies in the savings in time and cost in purchasing right of way. It will be remembered that the line location can be laid out on the aerial map to almost exactly the course the pipe will later take across the land itself, without a man entering the field to give evidence of the impending project to the land-owning public concerned, or of the specific property tracts constituting the proposed right of way. When, as in former times, a considerable force of engineers was abroad, occupied in searching out and surveying the location, every owner of land along the location line was apprised of developments; and was frequently inspired to set an exorbitant price for right of way. Nor was it uncommon for groups of owners of land along the route to collude on high-asking prices for passage across their respective properties.

But with the aerial photographic survey method, right-of-way purchasers are the first in the field. The line is divided into relatively short sections, which are assigned to individual right-of-way purchasers; and by simultaneous action on the respective sections all along the line, the owners may be approached before exaggerated ideas as to



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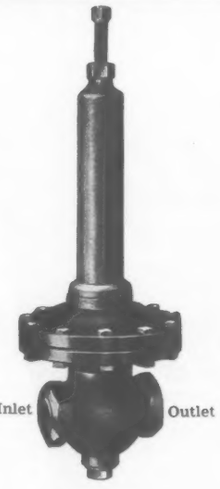

CF

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value can form, and the necessary right of way bought at mutually fair prices.

After completion of the line, the aerial photographic map, showing its exact position, serves permanently as an ideal index of the location in maintenance, planning of gathering lines, etc. There are also countless further ways of a minor nature throughout the location, construction, and operating procedure in which it makes for time-saving convenience.

The cost of aerial photographic mapping for pipe line projects varies according to a number of conditions, but it should not exceed $10 per square mile, except in foreign countries or on very short lines. In any case, as proved beyond question on many projects, the over-all savings entailed amount to many times the cost. One long-experienced pipe line engineer, speaking of the results on a certain major project, expressed it as follows: "Judging by what we saved by using the aerial maps, we got them for nothing, and made a lot of money on them besides."

By broad but conservative estimate that considers average conditions, aerial photographic mapping may be said to cause a saving of 25 per cent in the time ordinarily required from the inception of the project to getting the line into revenue-producing operation—with consequent reduction of the nonrevenue period of financing cost. Except in very easy country, the mileage of the line may be reduced 5 per cent and more from the total likely to result in making a location altogether from the ground. The further savings resulting from the minimum in right-of-way cost, the minimum in number of stream crossings, the minimum in amount of pumping energy for oil movement, and from other contributions to efficiency by the aerial maps are, while hardly subject to calculation, obviously material.

This story about aerial photography and pipe lines attempts to deal only briefly with the principal features. It should, however, suggest why the oil and gas industry, always on the alert for better ways to do a job, has long since come to consider the aerial photographic survey as an essential item for the pipe line builder's toolbox.

RECONDITIONING

(Continued from Page 204)

ditioning program is delayed until serious loss is resulting from leakage, interruption of operations may be required for replacement of sections damaged beyond possibility of welding repair. Reconditioning of oil lines may be done in short sections with small maintenance crews, but on long lines it is more economical for a reconditioning program to include a longer continuous part of the system to permit organization of the work to provide continuous progress of the several operations.

Recent improvements in equipment have simplified the operations of reconditioning. With pipe locators the ditch line may be accurately staked for uncovering the pipe and the location of intersecting lines determined to avoid damage by ditching machines. With a recently devised shoe attached to the ditching machine digger wheel the dirt is cleanly removed below the top quadrant on each side of the pipe, the shoe riding on top of the pipe and guiding the digger wheel to prevent bucket teeth from striking the pipe. With tractors of sufficient power equipped with live booms the loaded line operating under a normal working pressure is raised without shock or excessive strain to the top of the ditch to be supported by skids. A cleaning machine equipped with knives for removal of clinging mud and pipe coatings, with cutter teeth for removal of rust, and with brushes for cleaning of pits, will leave the pipe in condition for accurate inspection and welding repair.

Using portable gasoline-driven electric welding machines, and shielded-arc electrodes, corroded pits are filled with spot welding, small penetrated spots are covered with patches, long deeply corroded sections are covered with half soles or half pipe sections with inside diameter equal to the outside diameter of the pipe being covered. leaky collars repaired by welding beads at each end of the collar or in extreme cases completely housed by welded sleeves.

It is rare that shutdown is necessary for leaks, the leaks being cut off by tight clamping of patches or half soles until these are tack-welded in place permitting the removal of clamps for completion of welding. After an additional cleaning with a machine equipped with a brush head, the pipe may be efficiently prime-coated with a machine traveling on the pipe and operating with a brushing head similar to the cleaning machine, or by a painting attachment attached to the cleaning machine. A recently developed machine propelling itself along the pipe line will provide a smooth coating of hot dope of any desired thickness and follow it with tight spiral wrapping of pipe line felts, leaving a coating efficiently free from holidays.

The demands for reconditioning increase with the age of the pipe line industry. Improvements in equipment and reconditioning methods are being developed with current programs. Within a few years, reconditioning programs may be scheduled for at least 5 per cent of all lines in operation each year or approximately 10,000 miles per year.

Originally, pipe lines were designed for the immediate purpose of transportation of oil or gas between two points without regard for extended operation. Since the need for reconditioning or replacement is ultimately certain, provision should be made by design and in original construction to simplify this operation of maintenance.

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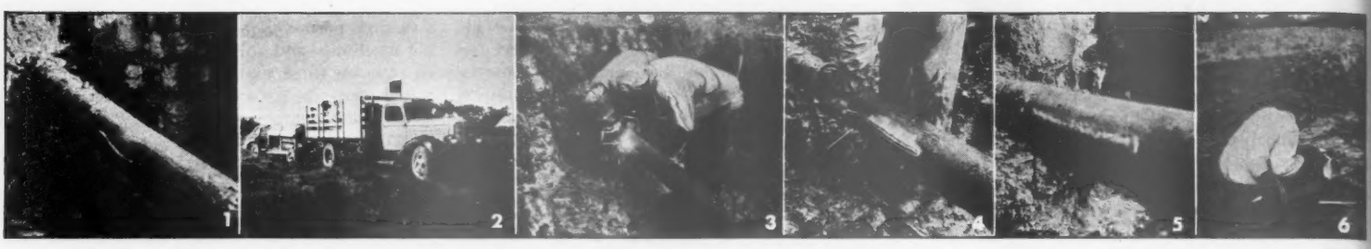


1—Split in 6-inch pipe line which was constructed in 1913. This line was operating with 1,000 pounds working pressure. 2—Welding machine and gang truck at leak to repair split. 3—Welder and helper running first filler bead after split was sledged back in shape. 4—Chipping slag and scale from filler beads with chisel and hammer. 5—The finish bead covering filler beads. 6—Cutter making 2-foot wrap to cover split

Maintenance of Pipe Lines

By H. B. TREFZ
Imperial Oil Co., Ltd.

Maintenance of pipe lines may be divided into six parts: pipe, tanks, pumping equipment, buildings and station property, communication system and maintenance department.

With the introduction of the electric welding machine and coated welding rod for repairing steel pipe the maintenance of pipe lines has witnessed some radical changes in the past few years. The electric welder has relieved some of the hardships of pipe repair. To repair small pits by electric welding the welder fills them up with new metal, being careful at the start not to hold a direct arc in the center of the pit. He starts at the outer edge and gradually forces the new metal to the center until he can cover the complete pit with the new metal without burning through the pipe. Large deep pits are repaired by placing small plates over the pit and welding it to the pipe. In some cases where it is impossible to shutdown a line to replace bad pipe and the pipe is very bad, a complete wrap is welded around the old pipe. This is only practiced when necessary.

In welding bad collars the welder starts on one side at the lip of the collar running a light bead down side to bottom, tying bead to pipe and collar. He then follows the same procedure on on the other half of the collar, leaving a small hole at the top or bottom for gas to escape. A second bead is now welded over the first bead, being careful not to close blow hole until second bead is in place, at which time he may close blow hole completing the weld at one end of collar. The same procedure may be followed at the other end of the collar. Some welders prefer to start on the under side of a collar and weld up while others prefer to start at the top and weld down. A good weld can be made in either case.

A good way to try out a welder on a repair job is to let him weld a leaky collar. If he can produce a perfect shut off of the oil you may feel assured he can qualify for pipe repair welding.

The new welder on repair work very often is afraid to burn his weld into the old pipe fearing it will go through and cause a fire, but after he gains confidence and a little experience, he will be able to carry on with a good weld. The foreman must check a new welder's work and give him all the assistance he can for pipe reconditioning by electric welding is no better than the welder makes it. A welder may have the best of rating as a welder, but if he loses interest in his work, or his mental attitude towards his foreman or the company he works for isn't satisfactory, his work can cause a great deal of future maintenance trouble. His physical condition plays a large part in his ability as a welder.

The foreman must furnish each welder with a helper and much care must be used in selecting the right type of man to put in his place. He must be of a quiet disposition with an alert mind, as the protection of the welder while working is entirely up to his helper. He must always be by the welder while he is working on a loaded line. The superintendent must see that his foreman and welder are properly educated in the use of electric welding on loaded lines, and if they are, the chances of accidents are no more than with any other type of repair work.

The success of the electric welder for repairing old pipe soon brought on another problem to work out, that of soil corrosion. It is noticeable that different companies have developed their own thoughts on pipe coating and no doubt each one thinks theirs is the best. No doubt several superintendents have carried on their own experiments with different types of pipe protection for several years and they know which type will give the best protection in their district. Soil analysis of new proposed rights of way is used today to determine the location of destructive soil conditions and shows where the new proposed line should especially be protected.

After solving the patching and repairing of pipe with electric welding and then the protection of the pipe being worked out to a satisfactory point, another trouble was presented to interfere with the new system of reconditioning. This was the excessive cost of cleaning the pipe and preparing it for reconditioning. A joint of 10-inch pipe, if it was cleaned properly, required about the labor of one man for a day of eight hours. This made the cost of reconditioning pipe much too costly to be practical in most cases. If the companies selling pipe repair supplies and machinery were to continue with the possible large new market for their product, the cost of pipe cleaning must be reduced.

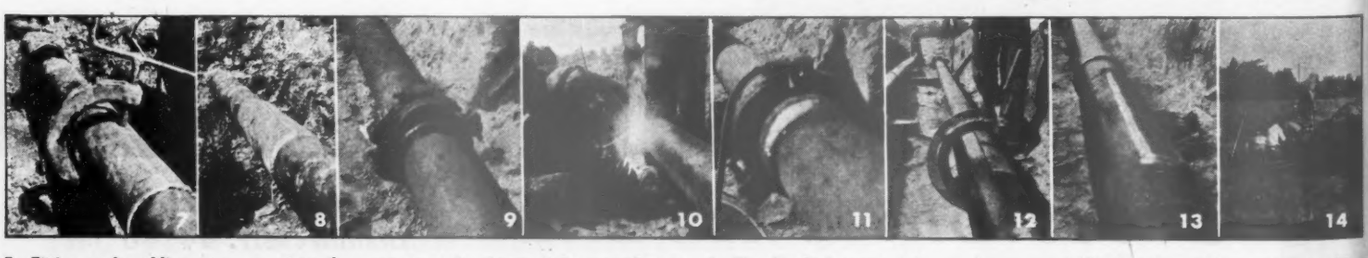
Years before a few types of pipe cleaners had been on the market, but they were a little too early yet to be of much use. The pipe cleaning machine reduced pipe cleaning from several dollars per joint to a few cents and at once the new pipe conditioning system had made a place in the oil industry for itself.

After discussing some of the present pipe reconditioning machines and their use it might be best to offer a few suggestions as to a system to use in pipe reconditioning on working lines. There are usually two kinds of leaks, collar leaks and pits. As it is not practical to do repair work in the winter months and most leaks show up during the spring thaw there are several locations of leaks and bad pipe on which the repair crew may make permanent repairs during the summer months.

Oil tanks on a pipe line system require less maintenance than pipe. If used for sweet oil, the deterioration from the inside is negligible. When used for sour oil the inside destruction is very fast if not properly cared for. In four or five years they are about destroyed by the gases from the sour oil. It is good practice in this case to clean the inside of the tanks every few years, repair all holes that might be in the bottom or roof and then put a protective coat over the bottom and all parts above the oil height. The walls of the tanks must be cleaned and brushed, making sure there is no rust or scale on them before applying the coating. Some of the trouble with sour oil has been eliminated by the floating roof as there is no space above the oil for corrosive gas to accumulate.

The outside of tanks should have a good coat

(Continued on Page 219)



7—Fitting and welding wrap on pipe; the wrap must be drawn tight around pipe. 8—The finished repair job now in use at 1,000 pounds working pressure. Time required to complete welds was about three hours. 9—Six-inch collar on high-pressure oil line prepared for welding. 10—Welder and helper welding collar. 11—Finished weld. 12—Plate clamped on 6-inch high-pressure oil line over bad place in pipe. 13—Plate welded to line. 14—Repair gang filling in bell hole after repairs

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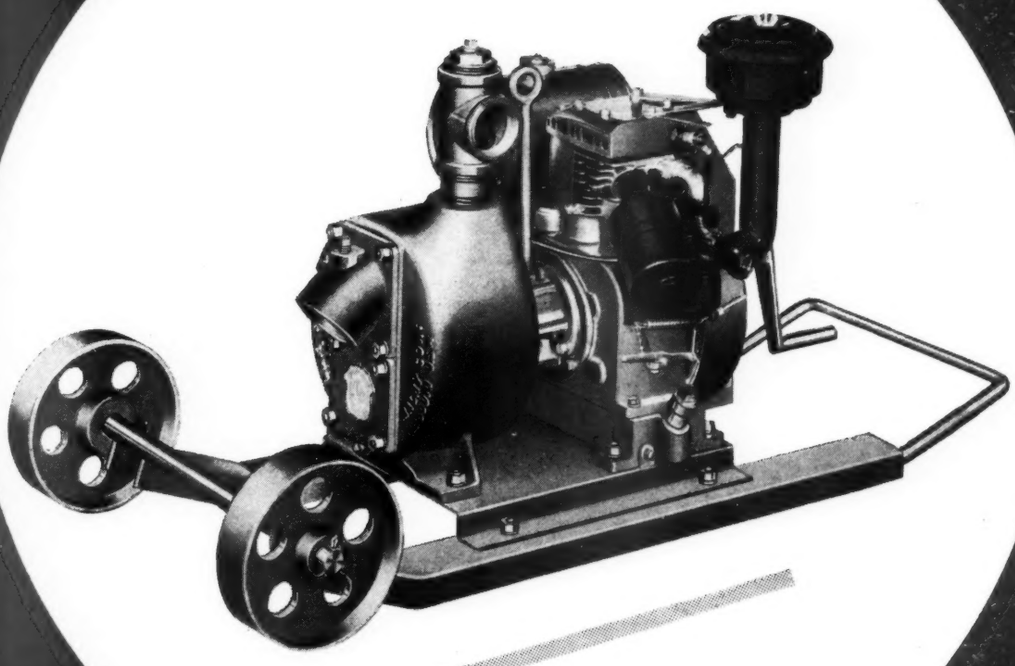

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Recent Developments Related to Underground Corrosion

By KIRK H. LOGAN
National Bureau of Standards

Much of the information in this paper is based on papers presented at the conference on underground corrosion that was held at the National Bureau of Standards in November, 1937. The purpose of this meeting was the exchange of papers and opinions among those directly concerned with underground corrosion. Many of the papers were of a confidential nature in that either the data were not complete or not in a form suitable for publication. The authors of the papers were urged to give detailed reports. While this rendered the papers more valuable to students of corrosion, it frequently made them too long for publication in the technical press. However, most of the papers have been abstracted and several have been published in full or in a revised form. The interest in underground corrosion is indicated by the fact that 82 papers were presented at the conference, which lasted for three days.

The object of this paper is to call attention to new developments in the field of corrosion and to indicate if possible where more detailed data can be found.

This paper calls attention to, and in some cases describes briefly, recent developments in the field of underground corrosion. In cases where there are published articles on the new developments references to them have been given. New pipe materials, protective coatings, cathodic protection, and corrosion tests, are mentioned and commented upon. Some of the new developments are mentioned because of their novelty rather than on account of their proven value.

Developments in Transportation of Water

Within the past few years the manufacturers of wrought pipe have made intensive efforts to interest the distributors of water in their products. One of the results is the offering of water pipes of rather light weight designed on the basis of the internal pressures to which they will be subjected plus one-sixteenth inch to provide against corrosion. After an investigation of the problem the Underwriters' Laboratories have issued a set of standards for steel water pipe for underground service.[1] The committee on specifications for cast iron pipe of the American Standards Association has also proposed specifications which contain a fixed allowance for corrosion.

The idea of selecting a pipe designed for the service it is expected to render is of course a very logical one. The difficulty comes in not overestimating or underestimating the factors to be encountered.

The wide variation in the corrosiveness of the soils in various parts of the country makes the allowance of a fixed amount of corrosion seem a little illogical. The danger in such allowances lies in the fact that the uninformed may assume that the allowance is sufficient to provide against the specific corrosive condition which his line will encounter.

Those interested in the design of pipe lines on the basis of the corrosion they are to encounter may find suggestions in a paper by Barnard,[2] engineer of the American Rolling Mill Co.

Another development is cement-asbestos pipe. This material in a slightly different mixture has been in use in Italy and elsewhere for 20 years or more. Exposure of flue pipe in a composition and structure slightly different from water pipe indicate that this material resists neutral and alkali soils well but that it is somewhat affected by poorly drained acid soils. A report on cement-asbestos pipe has recently been issued by the Underwriters' Laboratories.[3] It contains data on the strength of this material and reports on its use. This pipe may be of interest to the oil industry in connection with the disposal of salt water. A manufacturer of fiber conduit is considering the marketing of a fiber water pipe.

The development of another corrosion resistant pipe is under way.[4] The new pipe is cast centrifugally from a mixture of sulfur and some aggregate such as sand or coke. The addition of asbestos fiber is said to improve the product. The material can also be used as a lining for metal pipe. The use of this pipe for the transportation of salt water has been proposed.

Corrosion Resistant Metals and Alloys

A number of ferrous pipes containing small percentages of other metals such as copper, molybdenum, chromium, nickel and silicon have been offered for use in corrosive soils. None of the low-alloy irons in the Bureau of Standards tests of corrosion resistant materials[5] have been shown definitely to be superior to the commonly used ferrous pipes. More precise and extensive tests may show that there is some difference between the corrosion-resisting properties of the various ferrous alloys, but probably that difference is not large. Ferrous alloys containing large percentages of chromium or nickel or both have been found to corrode more slowly than ordinary iron or steel. Under a few conditions the iron-chromium alloy pits deeply at a few isolated spots.

Protective Coatings

A considerable number of pipe coatings are being developed. Among the coatings that have been tried rather extensively and have therefore a background to recommend them, are a plasticized coal-tar enamel and a cellophane wrapper. Both have been used in California. Information as to the characteristics of the new coal-tar enamel is rather limited. Specifications[6] for its application have been given. Although the paper referred to deals with the protection of steel water pipe, much of it is applicable to oil and gas lines. The new coating seems to be superior to the older enamels with respect to the effects of temperature.

H. G. Laub contributed a paper on the Use of Cellulose Wrappers in Pipe Line Protection to the Soil Corrosion Conference. In this paper the author describes the application of two spiral wrappings of cellulose over a coating of asphalt. This coating has been used by the Los Angeles Gas & Electric Co. for several years with excellent results. Fitzgerald and Johnson[7] also reported excellent results with a somewhat similar cellulose wrapper.

Sterling C. Lines has written the author that he is now able to apply a cement coating by means of the Wilson extrusion machine at a very reasonable cost. The application of the asphalt mastic coating which stood first in the American Petroleum Institute tests of pipe coatings has been so modified as to eliminate the spiral joint, which was a source of weakness. In addition the mixture of asphalt and inerts has been adjusted to give a product of maximum density and minimum absorption of moisture.

Reports from Australia indicate that hessian (burlap) is being used successfully as a pipe wrapper. Apparently the Australians are more successful in completely covering the protruding fibers than many people in this country have been. In parts of Australia a mixture of coal tar and natural asphalt is being used for protection. A very good discussion of this has been presented by Thomas[8] who found that for mixtures of coal tar pitch and natural asphalt the absorption of water increased with the amount of asphalt. For enamels of coal tar with limestone filler, the absorption of water increased with the amount of limestone.

In an article on asphalts[9] for coating felt shingles, Strieter has given considerable data on fillers which may be applicable to enamels for pipe coatings.

The oil producers and refiners will be cheered by the paper contributed by Kuhr and Pfeiffer[10] to the 1936 World Power Conference. They find that asphalt is superior to coal tar pitch as a pipe coat-

[1]Report on steel pipe lines for underground water service. Special Investigation 888, Underwriters' Laboratories, Inc.
[2]Russell E. Barnard, A Method of Determining Wall Thickness of Steel Pipe for Underground Use. Jour. A.W.W.A., 26, 791, June, 1937.
[3]Report on Transite Pressure Pipe and Fittings. Underwriters' Laboratories, Inc.
[4]Isaac Bencowitz. Casting Sulfur Pipe. Ind. & Eng. Chem., Ind. Ed., 30, 759, July, 1938.
[5]Kirk H. Logan, Soil Corrosion Studies, 1937—Corrosion Resistant Materials. In preparation for the NBS J. Research.
[6]Harry Hayes. Laboratory Control of Protective Treatment of Steel Lines by the Bureau of Water Works and Supply, Los Angeles; Jour. A.W.W.A. 28, 1372, 1936.
[7]Charles Fitzgerald and M. G. Johnson. Experiments on Pipe Coatings. Ind. & Eng. Chem., Ind. Ed., 30, 294; 1938.
[8]G. A. Thomas. Fundamental Requirements for Pipe Coatings. Commonwealth Eng., Melbourne, 24. 293 (1937).
[9]O. G. Strieter. Weathering Tests or Filled Coating Asphalts. NBS J. Research 20, 159, Feb., 1938.
[10]C. A. VonWolzogen Kuhr and J. Ph. Pfeiffer. Corrosion and Protection of Cast Iron and Steel Pipe Lines in Soil. Trans. Chem. Eng. Congress 1, 163. World Power Conference, London, 1936.

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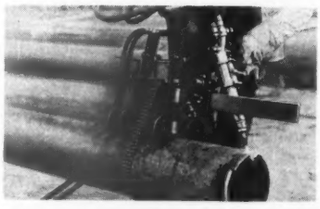

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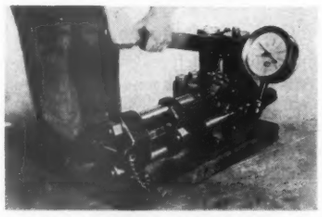

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ing and deny that coal tar pitch adheres better or absorbs less moisture. They also find that a reinforcement is superior to a wrapper in the construction of a pipe coating.

Some fundamental work on the properties and characteristics of asphalts is being done by Bray, Carr, Scott and Grebe of the Union Oil Co. of California, and by Van Doormaal of the Shell Development Co. It is impossible to present in a few words the results of their work. Those interested in asphalts should be on the lookout for articles by these research men. Their work should result in a better selection of asphalts for use underground.

In a recent article[11] the writer attempted to summarize the results of the American Petroleum Institute, American Gas Association, the Bureau of Standards field tests of pipe coatings. It is very probable that better coatings are now on the market. The problem is to tell which new coatings are better coatings.

Th electrical testing of protective coatings for holidays and pinholes prior to the placing of the coated pipe in the trench appears to be becoming more general. It is about time for some enterprising manufacturer to market a scientifically designed tester, equipped with a variable voltage control, and capable of producing a high-frequency current which would reduce the danger of injury to the operator.

There is need for a means of testing the coating after the trench has been back-filled since the coating may be injured in the process. Tests which would indicate the condition of the coating at any time would also be very desirable, but the development of such tests will be difficult because they must take into account the resistance of the soil which varies greatly from place to place and with the moisture which it contains.

[11]Kirk H. Logan. Bituminous Coatings for Underground Use. NBS J. Research 19, 695; Dec., 1937.

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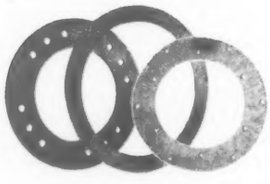

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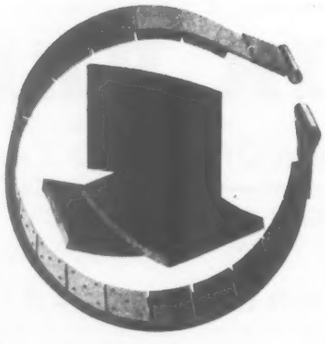

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Some preliminary work at the Bureau of Standards indicates that there is little probability of breaking down a protective coating by means of a high-voltage coating tester. Such apparatus as was developed by Clarvoe is quite successful in locating even very small pinholes, but it is not so satisfactory for detecting thin places in the coating unless they are very thin indeed. The performance of a nonbituminous coating which contains numerous minute pinholes or conducting points, as indicated by a high-voltage, high-frequency testing outfit, seems to show that such points are not sources of weakness in the type of coating tested. After five years' exposure to very corrosive soils the coated pipe appears to be free from corrosion in nearly every test, possibly because the pinholes quickly became clogged with rust which prevented further corrosion.

In 1937 five-year-old specimens of nonbituminous coatings were removed from 15 Bureau of Standards test sites. Of these a vitreous enamel and two hard rubber coatings afforded the pipes almost complete protection in all soils. It is probable that the few cases of slight corrosion which were observed under these coatings were due to injuries of the coatings. The thin paint and synthetic-resin coatings became brittle and blistered. The pipes beneath these coatings were rusted, sometimes quite badly. It appears, however, that where there was a general breakdown of the coating there were few deep pits. With the exception of one metallic coating in cinders, all coatings afforded considerable protection in all soils for the five-year period. It seems possible that the usefulness of thin coatings has been underestimated. However, until the value of these coatings has been determined by longer tests, the use of heavy coatings appears to be the safer practice.

In 1937 field tests were begun by the Bureau of Standards of four bakelite-base coatings. The first data on these tests will not be available before 1940.

The writer has frequently advised against the use of protective coatings as a means of preventing stray-current electrolysis because of the possibility of a concentration of the discharged current at flaws in the coating. Dr. W. Beck, a well known German worker on corrosion and author of numerous books and papers on this subject, proposed a novel way of meeting this difficulty at the corrosion conference. He suggested that a wire mesh be incorporated in a bituminous coating in such a way that it would touch the pipe at certain points and protrude through the coating at other points. Any current on the pipe would be conducted through the coating by the wires. Since the coefficient of corrosion is very low at high current densities, the current should be discharged with little corrosion of the wire and no corrosion of the pipe. The very small area of exposed metal would pick up little current in cathodic areas. Doctor Beck described a laboratory experiment to show the effectiveness of this plan.

Cathodic Protection

Closely related to protective coatings is cathodic protection. This was one of the most popular topics at the recent conference on underground corrosion. The literature on the subject is becoming rather extensive. In 1935 Ewing[12] prepared for the American Gas Association a rather complete summary of the information to be found in the literature. The Bureau of Standards has issued a letter circular[13] which briefly reviews recent articles on cathodic protection. The letter circular is useful chiefly in that it tells the reader where to look for detailed information on cathodic protection.

The most notable recent contributions to the subject have been made by G. I. Rhodes, who in a letter to the author said that he had succeeded in the application of cathodic protection to a pipe

[12]S. P. Ewing. Cathodic Protection of Pipe Lines. Gas Age Record 75, 179, 219, 261, March and April, 1935.
[13]Cathodic Protection of Pipe Lines. NBS Letter Circular 519, 1938. Free.

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line with no protective coating. A novel application of cathodic protection has been made by Scott to orchard heater lines in California. In this case the lines are very small in diameter and it is very important that there be no leaks.

There has been considerable interest in what should be the potential of the protected pipe with respect to the adjacent soil. The answers to this question have for the most part been opinions rather than conclusive demonstrations. When the great variety of soil conditions is considered, it seems rather improbable that any definite value of the potential can be set which is not too high for some conditions or too low for others.

Soil Surveys and Corrosion Tests

The work of J. M. Pearson of the Susquehanna Pipe Line Co. on the development of instruments and methods for electrolysis testing, and that of A. V. Smith of the United Gas Improvement Co. on methods of determining the conditions of pipe networks, are reducing the art of making electrolysis surveys to an exact science. The apparatus and methods are applicable also to studies of cathodic protection. Only an extended article could do justice to the methods of these men. Those interested should anticipate with interest papers by them.

W. G. Radley[14] has developed a very sensitive recording galvanometer and a nonpolarizing electrode which can be drawn through a cable duct. The two pieces of apparatus make it possible to study potentials of cables with respect to earth between manholes, something which could not be done so satisfactorily a few years ago.

As means for determining the corrosivity of soils the Corfield test and the so-called Shepard rod test are probably the most generally used. A manufacturer of electrical apparatus has recently placed on the market an apparatus for measuring soil resistivity which employs a four-terminal electrode, which is placed on the surface of the ground, and a current generated by turning a crank.[15]

Burton[16] has proposed a new method of measuring the electrical conductivity of soils. The measurements are made in the laboratory with a small alternating current which is amplified, rectified, and read on a sensitive direct-current instrument. The two last-named methods eliminate polarization effects.

Denison[17] has described a method of determining the corrosivity of soils which attempts to bring into play the more important factors which influence corrosion. A corrosion cell is set up under specified conditions. From the relation between the polarization voltages and the currents flowing from an anode in the form of a disc to an aerated screen cathode, the relative corrosivity of soils can be estimated. Comparison of the results of tests of soil samples taken along a pipe line with the leak and reconditioning records of that line shows that the test indicates the corrosivity of soils in a satisfactory way. This will be shown in a paper by Denison in this issue of The Oil and Gas Journal. One designing engineer has found that his predictions of the life of pipe from his use of the electrolytic cell agreed very well with his field observations in several instances.

Interpretation of Soil Corrosion Data

The interpretation of soil corrosion data obtained either from inspection of pipe lines or from laboratory tests has always been a difficult task. The data are usually far from uniform and on this account it is necessary to take a large number of observations and to average them. Averages by themselves give no indication of the dispersion of the data but this can be shown by computing the standard deviation. The standard errors of averages shows their reproducibility and enable the reader to determine the probability that the difference between two averages is significant. Research workers are finding that the application of statistical methods to corrosion data is very helpful whenever a sufficient quantity of data are available. The simpler statistical methods can be learned without great effort and they should be understood by everyone who has to present or to analyze data. However, some soil corrosion data do not conform to the conditions upon which some of the statistical methods are based and it is therefore necessary to determine the applicability of the method to the problem in hand.

Other important factors to be kept in mind in the study of corrosion are that the amount of corrosion is frequently not proportional to the period of exposure and that the values of maximum pit depths depend on the size of the area from which they are selected. Because of these facts a recommendation[18] has been made that soil corrosion data should not be expressed simply as rates of corrosion on some unit area, but that the corrosivity of soils or the corrosion of metals should be expressed in terms of three constants; one representing the maximum on a unit area in a unit of time, the second representing the way in which time affects the depth of pit, and the third the relation of the area of the specimen or pipe to the

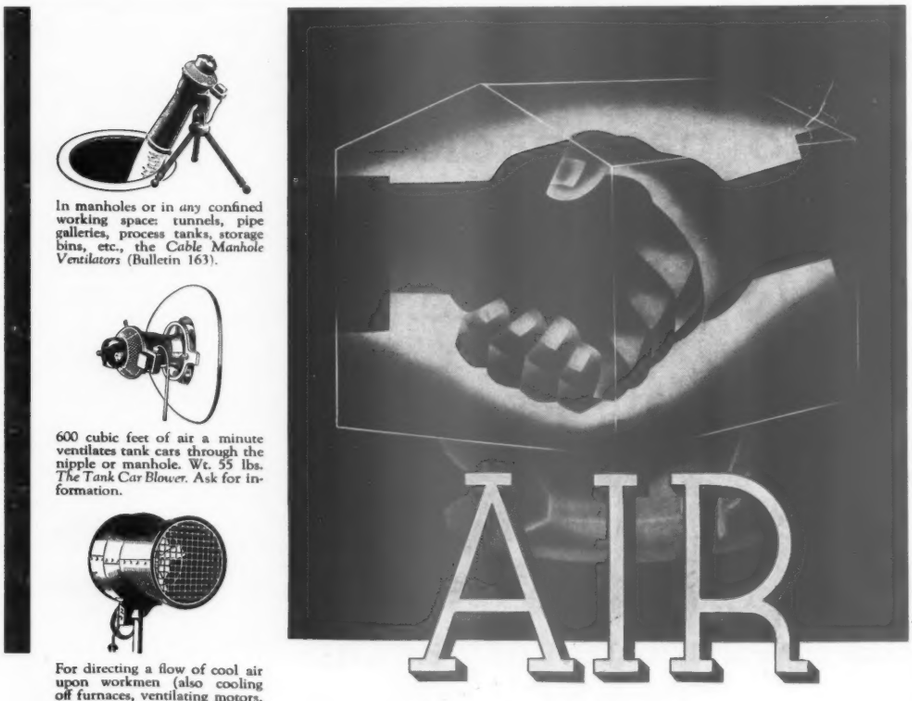
[14] W. G. Radley. Determination of the Cause of Sheath Corrosion. Elec. Eng. 57, 168; April, 1938.

[15] L. M. Goldsmith. Earth Resistivity Measurement. Petroleum Engineer, April, 1938.

[16] M. T. Burton. A Method of Direct Determination of Soil Corrosivity in Terms of Conductivity. Gas, Dec., 1937, p. 29.

[17] I. A. Denison. Electrolytic Measurement of the Corrosivity of Soils. NBS J. Research 17, 363, Sept., 1936 (RP918). See also Pipe Line Number of The Oil and Gas Journal, 1938.

[18] K. H. Logan, S. P. Ewing, and I. A. Denison. Soil Corrosion Testing. Symposium on Corrosion Testing Procedures, 1937. A.S.T.M. Monograph.



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depth of the deepest pit thereon. The carrying out of this suggestion presents some serious difficulties when applied to pipe line inspections; yet it can be shown that data on pit depths unaccompanied by information as to the effect of time and area are quite inadequate for predicting the future usefulness of a pipe line.

The relation between pit depth and time has interested many within the last three years and at least five equations have been offered to express it. All of the equations are empirical and most of them indicate that the pit depths or loss of weight is proportional to some fractional power of the exposure. Some authors suggest the use of the same exponent for all soils. Others prefer different exponents for different soil conditions. A somewhat similar situation exists with respect to the relation between pit depth and area. The probability that the average of the maximum pits chosen from small areas will not be as great as the average of the deepest pits chosen from larger areas is easily demonstrated and is generally recognized. Whether the same relation holds regardless of the size of the larger area is more debatable. At least three methods for dealing with the relation between maximum pit depths and areas have been proposed. The problem has an important bearing on the interpretation of pipe line inspections made by exposing short lengths of pipe and on the significance of the pit depths on small test specimens.[19]

Causes of Corrosion

A large part of the recent work related to underground corrosion has been of a directly practical nature, such as attempts to produce corrosion-resistant pipes and better protective coatings, but research has not been confined to these lines. In addition to the studies of asphalts already mentioned, the theory of corrosion has received some attention. Most of the efforts seem to have been directed toward explaining why metals do not corrode, i.e., to protective films and polarization phenomena. Some work has been started at the Bureau of Standards on measurement of anode and cathode potentials, on the development of corrosion products in soils, and on the stability of copper-sulfate electrodes. Burns and Haring of the Bell Telephone Laboratories presented an excellent paper on the mechanism of corrosion of iron in soils at the corrosion conference.

An interesting explanation of corrosion in continuously wet soils was advanced in Holland by Dr. Von Wolzogen Kuhr who attributes corrosion under such conditions to bacteria. These bacteria reduce sulfates to sulfides which act as a depolarizer or hydrogen acceptor. The bacteria do not directly attack the iron in the soil but destroy the conditions which otherwise prevent a continuation of the corrosion. Doctor Kuhr[10] represents the chemical action as follows: $4Fe+H_2SO_4+2H_2O \rightarrow 3Fe(OH)_2+2FeS$. The theory is supported by a large amount of qualitative evidence, and Evans in England has indicated that he expects to present quantitative data on the subject soon.

Conclusion

The above account is an attempt to indicate in a general way the newer developments in the battle against underground corrosion. Some of the items have been presented because of their novelty rather than on account of their proven worth. Experience has shown that the correct valuation of new ideas is very difficult. Pope's advice regarding the use of new words may be applied to new ideas regarding corrosion: "Be not the first by whom the new is tried nor yet the last to lay the old aside." Progress, however, is due largely to the courage of the adventurous.

[19]Kirk H. Logan. The Engineering Significance of the Bureau of Standards Soil Corrosion Tests. In preparation for the NBS J. Research.

Maintenance of Pipe Lines

(Continued from Page 210)

of paint every few years to protect them from the weather. One coat of primer and two of aluminum will give very good service. If tanks are used for sour oil, the primer must be gas proof to secure a good lasting paint job.

The all-welded tanks of today have eliminated some of the tank troubles. With the old riveted tanks a caulker had to go over them about once a year to tighten up the seams in places and eliminate the leaks. It is also possible to build a tighter and better roof with electric welding.

Years ago leaky bottoms presented a troublesome and costly maintenance problem. After the tank is cleaned and the gas eliminated it is but a minor job to electric-weld patches on holes in the tank bottom and also the roof. If there are two welding machines available, one for tacking the patches and the other for running seams, it takes but a very little time to recondition the average bad tank.

Some things a foreman must keep in mind while working around tanks are: Never let a man go into a closed tank without being equipped with a gas mask and line, and if a major repair job is to be carried on in a tank, to cut out a door sheet and if possible, take a sheet out of the roof.

It is good practice to keep the firewalls of sufficient height to care for the capacity of the tank in case of fire or break and also keep the water drained out of them. Grass and weeds about the tank and firewall should be well cleared away. If the tanks have automatic breathers on the roofs, they should be checked at regular intervals, also gauge hatch covers. When tanks are located in a cold climate the water draw-off valves should be checked every fall to make sure they are protected from freezing.

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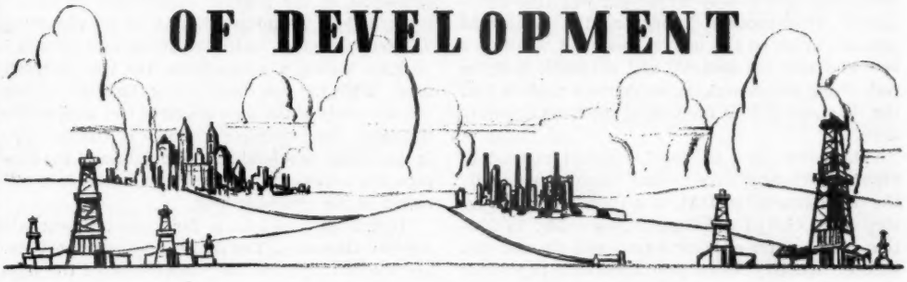

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Trend in Multiflame Pipe Line Welding

T. W. GREENE
Engineer, Linde Air Products Co., New York

During the past year three developments of far-reaching importance have resulted not only in speeding the oxyacetylene welding of pipe in general and of overland pipe lines in particular, but also in producing higher quality welds at lower cost. These are: (1) A new four-flame tip for bell-hole or position welding; (2) a new six-flame tip for double-lengthening and for rotating welds; and (3) a new low-alloy steel welding rod which further facilitates the utilization of the advantages attending these multiflame tips for hand welding.

Oxyacetylene welding has been used for many years for joining pipe, and throughout this period there have been constant improvements. In 1931 a technique, now widely employed, was first introduced. This process, known as the Lindeweld process, involved the use of backhand welding, a special flame adjustment, and a special welding rod. Using this technique, welds were made in half the time and at half the cost of methods formerly used.

The advantages of the Lindeweld method of pipe-line welding were greatly supplemented by the development, in 1934, of a three-flame tip, designed especially for making rolling welds. In addition to the main welding flame, this tip had two smaller auxiliary flames positioned so as to preheat the vee directly ahead of the point of welding. Savings of more than 25 per cent in welding rod and gases and of 30 per cent or more in welding time were effected by the use of this multiflame tip, as compared with single-flame welding.

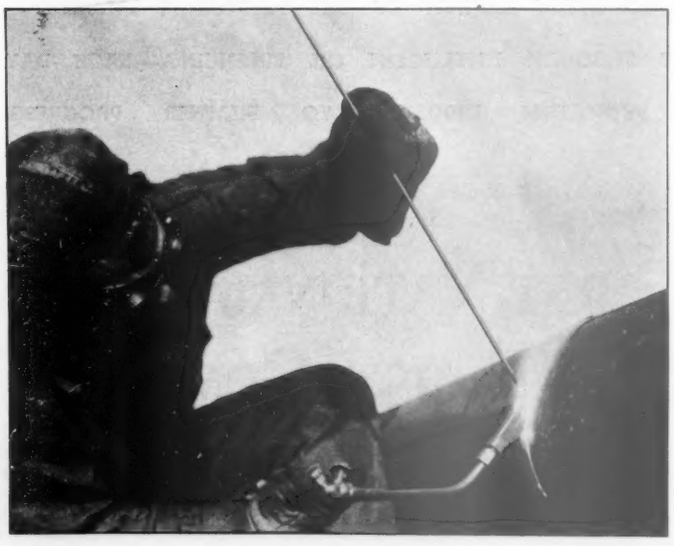
Based on the success of the three-flame tip, the theory of multiflame distribution of heat in oxyacetylene welding was well established and an extensive investigation of the possibilities of other multiflame tips was begun immediately. This investigation, spurred by the recent popularity of the all-bell-hole method of construction, resulted in the development of two new tips—a four-flame tip for position welds and a six-flame tip for rolling welds.

Four-Flame Tips for Position Welding

The four-flame tip, as the name implies, consists of four separate flames burning from a common head. Two small flames are used for preheating the pipe ahead of the welding puddle, a third flame is used for preheating the rod, while the fourth flame does the actual welding.

This new four-flame tip adapts multiflame welding to the making of position welds such as are employed in the popular all-bell-hole method of construction. As no multiflame tip previously developed had given entirely satisfactory results in position welds, a single-flame tip was generally used. With the one flame doing the work of heating the walls of the pipe ahead of the weld and, at the same time, keeping a puddle of molten metal in the weld, considerable manipulation of the blowpipe was necessary, resulting in less efficient utilization of the available heat.

Distribution of heat is far more efficient with the four-flame tip. The flames are so proportioned and located that the only movement of the blowpipe required is continually forward, while the rod is manipulated slightly in order to control the height and contour of the deposited weld metal. With the introduction of the new four-flame tip and welding rod, it is now possible to produce a bell-hole weld in about the same time that it formerly took to make a rolling weld with a three-flame tip. For example, on 16-inch pipe with one-fourth inch wall, an operator can complete a position weld in 8 to 12 minutes.



The four-flame tip, used for position welds, increases welding speeds more than 25 per cent

No special technique is required when making position welds with the four-flame tip. Operators proficient in the Lindeweld technique will have no difficulty using the four-flame tip, although they will find it necessary to proceed at a faster rate.

The six-flame tip is similar in design to the four-flame tip except that it has two additional vee preheat flames. Four flames of this tip preheat the walls of the pipe, a fifth flame preheats the rod, and a sixth flame does the actual welding. Because of the more effective application of heat, the six-flame tip, as compared with the three-flame tip, increases the speed on rolling welds by 35 to 70 per cent, depending on the size of the pipe. As compared with single-flame welding, the speed of welding with the six-flame tip is more than doubled. For example, results from the field show that the six-flame tip averages somewhat less than five minutes per weld on 8-inch pipe with one-fourth inch wall thickness, and approximately eight minutes per joint on 16-inch diameter pipe with a wall thickness of one-fourth inch.

Time of making rolling weld with six-flame tip is less than half that required with a single-flame tip

New Welding Rod

Another step in the progress of oxyacetylene welding of overland pipe lines was the introduction this year of a new low-alloy welding rod which develops an average tensile strength of 10,000 to 12,000 pounds per square inch greater than rods previously used for pipe welding, yet will give a weld of sufficient ductility to meet any requirements. This new rod, known as Oxweld No. 32 C.M.S. steel welding rod, was primarily developed for use with the new four- and six-flame tips in the welding of high-strength pipe by the Lindeweld process.

In addition to its greater strength, this new rod offers considerable resistance to overheating in the molten state, and solidifies more rapidly. This makes it easier to control the welding puddle and considerably increases the rate of welding which in turn effects a reduction in gas consumption per weld.

Small Diameter Pipe

For pipe diameters below 6 inches and for wall thicknesses less than one-fourth inch, the four-flame tip should be used for rolling welds, as well as for position welds. The six-flame tip is not recommended for rolling welds on pipe less than 6 inches in diameter because the rear preheating flames are of little value on pipe of this size.

The same principle of economical distribution of heat in welding pipe for oil, gas, and other lines has been applied to casing welding. By slight modification, multiflame tips, somewhat similar to the four-flame tips previously described, have been perfected for making butt welds in casing. With these tips the same relative speed and economy required for casing construction have been obtained for casing welding as for pipe lines.

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Pres.—President
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Gen. Mgr.—General Manager
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Supt.—Superintendent
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Ch. Dispatcher—Chief Dispatcher
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B

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E. L. Buckley, *Pres.*; Marquis G. Eaton, *V. P.* and *Treas.*; Helen Sanders, *Sec.*; M. D. Altgelt, Corpus Christi, Tex., *Gen. Supt.*; J. T. Riley, Corpus Christi, Tex., *Asst. Supt.*; D. E. Gantt, Corpus Christi, Tex., *Dist. Supt.*; A. E. Benham, Freer, Tex., *Foreman*; A. S. Zachry, Jr., *Ch. Clerk*. 125 miles, 4½- and 5½-inch.

Cushing Refining & Gasoline Co., Cushing, Okla.

R. C. Jones, *Pres.*; Rex H. Winget, *V. P.*; M. E. James, *Sec.* and *Treas.*; J. H. Hutchinson, *Gen. Supt.*; A. E. Kirk, *Supt. Pipe Lines*; J. A. Dickey, *Auditor*. 60 miles, 3-inch.

D

Danciger Oil & Refineries, Inc., P. O. Box 670, Fort Worth, Tex.

Dan Danciger, *Pres.*; Jack Danciger, A. Danciger, *V. P.s*; Joe Danciger, *V. P.* and *Treas.*; J. E. Baeth, *Sec.*; W. D. McIntyre, Hilton Hotel, Abilene, Tex., *Gen. Supt.*

Deep Rock Oil Corp., Tulsa, Okla.

H. N. Greis, *Trustee*; A. L. Dade, *Mgr.*; J. H. Tubbs, *Asst. Mgr.*; I. Biddle, Bristow, Okla., M. L. Eckley, Drumright, Okla., G. D. Biddle, Seminole, Okla., *Supts.*

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Derby Oil Co., The, Wichita, Kans.

Carl Fisher, *Pres.*; A. L. Derby, *Exec. V. P.* and *Gen. Mgr.*; E. Wasser, *Sec.*; E. C. Claiborne, *Treas.*; John Schell, *Gen. Mgr. Pipe Lines*; L. E. Woods, Wichita, Kans., *Gen. Supt. Pipe Lines*; E. L. Edwards, Hutchinson, Kans., *Foreman*; C. W. Vincent, L. G. Getter, Burrton, R. E. Mayfield, W. M. Reitz, A. J. Dunn, R. G. McLin, R. Glazebrook, Wichita, Sherman Tate, O. L. McGregor, R. E. Tassey, Wellington, M. J. Hull, Haven, H. T. Parker, James Davis, Burrton, *Engrs.* 221 miles.

Driscoll Pipe Line, The, 632 Bedell Bldg., San Antonio, Tex.

E. L. Buckley, *Owner*; M. D. Altgelt, Corpus Christi, Tex., *Gen. Supt.*; J. T. Riley, Corpus Christi, Tex., *Asst. Supt.*; Jack Powers, Corpus Christi, Tex., *Foreman*; A. S. Zachry, Jr., *Ch. Clerk*. 15 miles, 4½-inch.

E

Eason Oil Co., Enid, Okla.

T. T. Eason, *Pres.* and *Gen. Mgr.*; L. D. Hinman, *V. P.*; T. W. Eason, *Sec.* and *Treas.*; W. H. Taft, *Engr.*; R. E. Neil, *Office Mgr.*; A. C. Hatton, *Pur. Agt.* 100 miles, 4-inch.

East Texas Refining Co., Tower Petroleum Bldg., Dallas, Tex.

F. W. Burford, *Pres.*; John J. Thomas, *V. P.*; John R. Scott, *Sec.*; E. V. Campbell, *Treas.*; J. R. Mickle, Longview, Tex., *Supt.*; C. L. Craker, *Dist. Gauger*; W. A. Myers, *Dist. Gauger*. 130 miles, 3- and 6-inch.

El Dorado Refining Co., The, Eldorado, Kans.

C. G. Yankey, *Pres.*; R. H. Bradford, T. A. Helling, *V. P.s*; George J. Peterschmidt, *Sec.*; R. H. Bradford, *Treas.*; G. C. Anderson, *Supt.* 30 miles, 2-, 3- and 4-inch.

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Eureka Pipe Line Co., The, Oil City, Pa.

Allan T. Towl, *Pres.*; J. M. Tussey, *V. P.* and *Treas.*; E. W. Macklin, Parkersburg, W. Va., *V. P.* and *Gen. Mgr.*; E. W. Ziegler, *Sec.*; M. J. Leonard, Parkersburg, W. Va., *Supt.*; W. P. Norris and W. F. Alexander, Parkersburg, W. Va., *Div. Supts.* 4,394 miles.

F

Fargo Western Oil Co., 431 Wyoming National Bank Bldg., Casper, Wyo.

W. D. Weathers, *Pres.*; E. J. French, Ben Hunsaker, *V. P.s*; M. R. Barrett, *Sec.* and *Treas.*; C. J. Galusha, *Field Supt.* 22½ miles, 6-inch.

Frontenac Pipe Line Co., Peoples National Bank Bldg., Tyler, Tex.

James A. Wales, *Pres.*; John Warren, *V. P.*; H. B. Morris, *Sec.*; Lucille Mardock, *Treas.*; D. W. Johnson, Kilgore, Tex., *Gen. Supt.* 50 miles, 4- to 8-inch.

G

General Pipe Line Co. of California, Los Angeles, Calif.

A. L. Well, *Pres.*; R. A. Sperry, S. J. Dickey, E. L. Adams, *V. P.s*; D. W. Woods, *Sec.*; W. Cunningham, *Treas.* 795 miles.

Glacier Production Co., Butte, Mont.

Frank M. Kerr, *Pres.*; Frank W. Bird, *V. P.* and *Gen. Mgr.*; S. P. Hogan, *Sec.*; J. R. Thomas, *Treas.*; R. D. Smith, *Asst. Gen. Mgr.*; H. H. Cochrane, *Ch. Engr.*, M. A. Hardie, Jr., *Gas Engr.*; J. E. Hupp, *Field Supt.*; M. A. Hardie, Sr., *Supt. Gas Oper. and Constr.*; E. M. Parkin, *Supt. Absp. Plant*. 23 miles, 2- to 4-inch.

Golden Bear Oil Co., 606 Union Bank Bldg., Los Angeles, Calif.

J. M. Feldman, *Pres.*; Charles P. Prewett, *V. P.*; Louis L. Swarthe, *Sec.* and *Treas.*; Ray T. Kemper, *Ch. Engr.* 12 miles, 6-inch.

Grayburg Pipe Line Co., 1419 Smith Young Tower, San Antonio, Tex.

R. D. Brown, *Pres.*; Claude D. Birkhead, Stanley Zahn, *V.P.s*; Arthur D. Kohler, *Sec.* and *Treas.*; F. M. Widmeyer, *Asst. Sec.* and *Asst. Treas.*; Lowell Cude, Somerset, Tex., Tom A. Smith, Rt. 1, Box 283-A, Seguin, Tex., *Supts.* 43.31 miles, 2- to 4-inch.

Gulf Refining Co., (Houston Pipe Line Dev.), Gulf Bldg., Houston, Tex.

F. A. Leovy, *Chm. Bd.*; J. F. Drake, *Pres.*; H. L. Stone, *Exec. V. P.* and *Gen. Counsel*; E. C. Bothwell, *V. P.*; H. A. Gidney, Box 1166, Pittsburgh, Pa., *V. P.* and *Comptroller*; Rush Greenslade, Tulsa, Okla., E. C. Kincade, C. R. Minor, Shreveport, La., W. B. Pyron, *V. P.s*; David Proctor, *Sec.*; J. E. Nelson, Pittsburgh, Pa., *Treas.*; J. S. Atkinson, Shreveport, La., *Asst. Sec.*; L. E. Delcuze, *Asst. Sec.*; C. H. Stevens, *Asst. Treas.*; Samuel Johnston, W. L. Naylor, Pittsburgh, Pa., *Asst. Compts.*; N. H. Perry, *Gen. Supt.*; J. L. Irvin, *Asst. Gen. Supt.*; C. M. Rosebrugh, *Ch. Engr.*; A. M. Smith, *Auditor*; W. L. Sloan, *Ch. Dispatcher*; W. H. Cederlof, *Asst. Ch. Dispatcher*; C. C. Sampson, *Supt. Tel.* and *Tel.*; W. L. Shannon, *Ch. Gauger*; W. F. Rol-

lins, Fort Worth, Tex., W. P. Stine, Beaumont, Tex., L. A. Brauer, Lufkin, Tex., F. C. VanCleave, Shreveport, La., *Div. Supts.;* C. C. Perry, Beaumont, Tex., R. C. Sanders, Fort Worth, Tex., *Asst. Div. Supts.;* E. Jones, Fort Worth, Tex., G. W. Tohline, Beaumont, Tex., L. L. Kincade, Shreveport, La., F. L. Benthal, Lufkin, Tex., *Master Mechanics;* J. D. Jennings, Houston, Tex., W. B. Adams, Sour Lake, Tex., C. G. Johnson, Beaumont, Tex., F. K. Irwin, Vinton, La., C. E. Hanratty, Beaumont, Tex., J. W. Pyron, Odessa, Tex., J. P. Cagle, Burkburnett, Tex., C. C. Chambers, Roscoe, Tex., E. F. McEntire, Fort Worth, Tex., W. H. Parr, Borger, Tex., Guy Crisman, Overton, Tex., H. A. VanCleave, Wortham, Tex., J. A. Brown, Mooringsport, La., J. A. Carnahan, Dubberly, La., *Dist. Foremen;* C. G. Brandt, Port Arthur, Tex., E. R. Martin, Chester, Tex., W. T. Denard, Lufkin, Tex., Rex Ward, Henderson, Tex., W. R. Powell, Big Sandy, Tex., J. E. Clifton, Daltillo, Tex., C. R. Jarratt, Timpson, Tex., *Foremen, Pump Stations;* J. G. Pittman, Hobby, Tex., G. W. Holt, Beaumont, Tex., W. M. Boyd, Sour Lake, Tex., T. L. Thompson, Ranger, Tex., J. F. Nixon, Midland, Tex., L. R. Woodall, Clyde, Tex., R. Walker, Coahoma, Tex., J. R. Ross, Weatherford, Tex., H. E. Harris, Grandview, Tex., W. H. Deprang, Mooringsport, La., *Running Ch. Engrs.;* Guy Enloe, *Warehouseman;* R. M. Pyron, *Foreman Machine Shop;* Clyde Hayer, Beaumont, Tex., *Asst. Foreman Machine Shop.;* B. H. Jenkins, Houston, Tex., S. C. Lipscomb, C. N. Deaton, Fort Worth, Tex., *Constr. Foremen;* J. E. Gardner, Fort Worth, Tex., Floyd Harrison, Shreveport, La., *Civil Engrs.*

Gulf Refining Co. (Tulsa Pipe Line Division), Tulsa, Okla.

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H

Hancock Oil Co. of California, The, 2828 Junipero St., Long Beach, Calif.

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Imperial Pipe Line Co., Ltd., The, Sarnia, Ontario, Canada

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K

Kaw Pipe Line Co., Houston, Tex.

B. E. Hull, *Pres.;* J. K. McGoldrick, *V. P.* and *Gen. Mgr.;* E. V. Guidinger, A. N. Horne, *V. P.s;* H. L. Stewart, *Sec.* and *Treas.* 444.5 miles.

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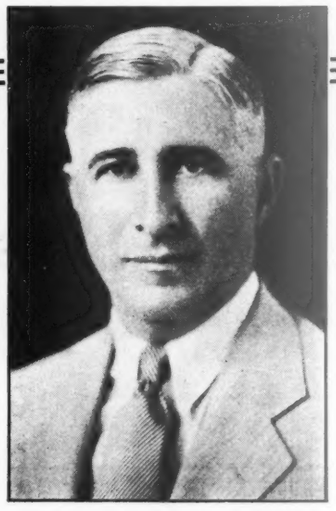
L

Leonard Pipe Line Co., Mount Pleasant, Mich.

J. Walter Leonard, *Pres.;* D. E. Brach, *V. P.* and *Sec.;* B. M. Jones, *Treas.;* R. Bloomer, *Field Supt.* 82 miles, 4- and 6-inch.



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M

Magnolia Pipe Line Co., Box 900, Dallas, Tex.

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N

National Refining Co., The., Hanna Bldg., Cleveland, Ohio

W. H. Lamprecht, *Pres.;* H. F. Heil, *V. P.;* G. M. Taylor, *Sec.* and *Treas.;* A. B. Ayling, Box 1000, Bartlesville, Okla., William Jack, Box 149, Eldorado, Kans., *V. P.s;* J. T. Johnson, Box 1000, Bartlesville, Okla., *Asst. Supt.* 811 miles.

National Transit Co., 206 Seneca St., Oil City, Pa.

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New York Transit Co., Olean, Cattaraugus County, N. Y.

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Normandie Oil Corp., 1102 Sterling Bldg., Houston, Tex.

Morris Frankel, *Pres.;* R. R. Frankel, *V.P.;* L. R. Frankel, *Sec.;* Lillian Freedman, *Treas.;* W. A. McKee, *Gen. Supt.*

Northern Group Pipe Lines, 26 Broadway, New York, N. Y., comprising Indiana Pipe Line Co., Buckeye Pipe Line Co., Northern Pipe Line Co., New York Transit Co.

D. S. Bushnell, *Pres.;* P. R. Applegate, *V. P. in Chg. Oper.;* H. D. Bushnell, *Gen. Counsel;* J. R. Fast, *Sec.;* C. H. Cleaver, *Treas.;* B. A. Towl, *Mgr. Real Estate*

and *Tax Dept.*; A. B. Oakes, *Asst. Mgr. Real Estate and Tax Dept.*; J. H. Peper, *Ch. Engr.*; R. J. Beatty, *Freight Traf. Mgr.*; O. L. Nahouse, *Pur. Agt.*; E. M. Welsh, *Oil Traf. Mgr.*; W. H. Flann, 206 Seneca St., Oil City, Pa., *Supt. of Tel.*

Northern Pipe Line Co., 206 Seneca St., Oil City, Pa.

J. A. Bartlett, *V. P.* and *Gen. Mgr.*; J. P. Blackford, *Asst. Sec.*

Norwalk Co., The, 634 S. Spring St., Los Angeles, Calif.

Lionel T. Barneson, *Pres.*; H. J. Barneson, J. L. Barneson, *V.P.s*; W. E. Kropp, *Sec.*; K. E. Grigsby; *Gen. Supt.*; E. C. Spencer, *Plant Supt.*; G. C. Mintier, *Ch. Gauger*; A. E. Seivi, *Constr. Foreman.* 18 miles, 4- and 6-inch.

Nueces Pipe Line Co., Heep Bldg., Corpus Christi, Tex.

J. L. Sullivan, *Pres.*; G. E. Sullivan, *V. P.*; B. K. S. Garnett, *Sec.* and *Treas.*; I. J. Alexander, *Supt.* 15 miles, 3- and 4½-inch.

O

Oklahoma Pipe Line Co., Tulsa, Okla.

W. R. Finney, *Pres.*; Paul Griffin, *V. P.* and *Treas.*; Charles Nelson, Jr., *Sec.*; Bruce Ramsey, *Supt.*; F. E. Warterfield, Jr., *Ch. Engr.*; T. D. Walkley, Route 1, Drumright, Okla., R. Henry, Box 750, Wewoka, Okla., George B. Randels, Box 967, Wilson, Okla., *Dist. Foremen*; H. P. Hellinghausen, *Pur. Agt.* 1,560.63 miles.

Old Dutch Refining Co., Muskegon, Mich.

Earl C. Roff, *Pres.*; J. H. Bender, *Sec.* and *Treas.*; Lee H. Self, *Engr.*; M. L. McHenry, *Electrician*; John Tyson, *Chemist.* 8.25 miles, 4-inch.

Olney Oil & Refining Co., 1111 City National Bldg., Wichita Falls, Tex.

C. W. Cahoon, Jr., *Pres.* and *Treas.*; Joe A. Kell, *V.P.*; C. M. Crowell, *Sec.*; Jack P. Slater, *Gen. Supt.*; Philip E. Slater, Archer City, Tex., John L. Cozart, *Foremen.* 20 miles, 4-inch.

Osage Trust, Chadron, Neb.

Edwin D. Crites, *Trustee*; H. E. Reische, *Sec.*; C. F. Coffee, *Treas.*; E. B. Jones, Osage, Wyo., *Gen. Mgr.*, H. T. Thorson, *Supt.* 4 miles.

O'Shaughnessy, I. A., Inc., Union National Bank Bldg., Wichita, Kans.

I. A. O'Shaughnessy, *Pres.*; F. L. Jehle, J. F. O'Shaughnessy, *V. P.s*; L. W. Dyer, *Asst. Sec.* and *Asst. Treas.*; F. A. Smalley, Blackwell, Okla., H. B. Overton, Lemont, Ill., *Supts.*; F. W. Emmerson, Oklahoma City, Okla., *Asst. Supt.* 138 miles, 6-inch.

P

Pan American Pipe Line Co., 122 E. Forty-second St., New York, N. Y.

Robert E. Wilson, *Pres.*; E. G. McKeever, *V. P.*; J. A. Carroll, Jr., *V. P.* and *Treas.*; D. H. Baker, *Sec.* 216 miles, 2- to 12-inch.

Panhandle Refining Co., Panhandle Bldg., Wichita Falls, Tex.

Roy B. Jones, *Pres.*; M. A. Chambers, *V. P.* and *Treas.*; R. C. Standard, *V. P.* and *Sec.*; Charles Byrnes, Lueders, Tex., *Pipe Line Supt.* 14 miles, 2-inch.

Panola Pipe Line Corp., Box 839, Dallas, Tex.

H. L. Hunt, *Pres.*; J. S. Loftin, Jr., *V. P.*; Roy Lee, *Sec.* and *Treas.*; Fred Taylor, *Supt.*; Robert Gray, *Gauger*; O. C. Zoller, *Engr.*; W. H. Owens, B. L. Roberts, R. E. Wright, *Line Walkers*; B. H. Bird, J. C. Cantrell, A. N. Cooper, D. W. Gunn, J. H. Roark, C. C. Sherwood, R. L. Smitherman, C. W. Brister, *Pumpers.* 60 miles, 4- and 6-inch.

Paxotex Pipe Line Co., 225 Bush St., San Francisco, Calif.

R. W. Hanna, *Pres.*; M. E. Lombardi, *V. P.*; B. W. Letcher, *Sec.*; V. F. Palmer, *Treas.* 195 miles, 6-inch.

Potter Bros. Pipe Line Co., Inc., Mayfield-Alford Bldg., Kilgore, Tex.

Tom Potter, *Pres.*; W. H. Sanders, *V. P.*; Julian Potter, *Sec.* and *Treas.*; J. H. Fleming, *Supt.*; George S. Reed, *Auditor.*

Premier Oil Refining Co. of Texas, Longview, Tex.

Sylvester Dayson, *Pres.*; Sam W. Ross, *V. P.*; R. P. Hargis, *Sec.* and *Treas.*; W. T. Reed, *Supt.*; J. G. Sullivan, *Ch. Gauger.* 19 miles, 3- and 6-inch.

Pure Oil Pipe Line Co. of Pennsylvania, Chicago, Ill.

D. D. Irwin, *Pres.*; Henry Hauseman, *V. P.*; C. H. Jay, *Sec.* and *Treas.*; J. H. Botkin, *Comptroller*; E. A. McCadden, Marcus Hook, Pa., *Terminal Supt.* 57 miles, 6- and 8-inch.

Pure Transportation Co., Chicago, Ill.

D. D. Irwin, *Pres.*; Henry Hauseman, R.D. McClaran, Beaumont, Tex., *V. P.s*; C. H. Jay, *Sec.* and *Treas.*; J. H. Botkin, *Comptroller*; R. H. Parr, Van, Tex., H. C Christman, Lake Charles, La., J. F. Miller, Mount Pleasant, Mich., C. L. Bernard, Muskogee, Okla., *Supts.*; R. E. Young, Muskogee, Okla., *Mgr. Okla. Lines.* 946 miles, 2- to 10-inch.

R

Reagan County Purchasing Co., Inc., Fair Bldg., Fort Worth, Tex.

Barney Holland, *Pres.*; D. A. Richardson, *V. P.*; R. L. Roberts, *Sec.* and *Treas.*; Neil Stallard, Texon, Tex., *Dist. Supt.* 6- to 10-inch.

Republic Pipe Line Co., 223 Fourth Ave., Pittsburgh, Pa.

O. D. Robinson, *Pres.*; David D. Johnson, D. W. Hovey, *V. P.s*; William H. Moreland, *Sec.* and *Treas.*; George E. Casey, Nixon Bldg., Corpus Christi, Tex., *Gen. Supt.* 25 miles.

Richfield Oil Corp., 555 S. Flower St., Los Angeles, Calif.

H. F. Sinclair, *Chm. of Bd. of Dir.*; Charles S. Jones, *Pres.*; W. Alton Jones, *Chm. Fin. Com.*; F. A. Morgan, W. T. Dinkins, A. M. Kelley, *V. P.s*; M. Richard Gross, *Treas.*; W. T. Autrey, *Comptroller*; Cleve B. Bonner, *Sec.*; E. B. Downey, *Asst. Treas.* and *Asst. Sec.*; Leonard Switzer, *Asst. Sec.*; A. H. B. Gore, Box 470, Long Beach, Calif.; *Supt.*; Gordon B. Slater, Box 107, Lebec, Calif., *Div. Foreman*; E. T. Smith, Box 470, Long Beach, Calif., *Office Engr.*; L. A. Wilson, Box 470, Long Beach, Calif., *Field Engr.*; William Hoffman, Box 470, Long Beach, Calif., *Constr. Foreman.* 407 miles, 2- to 12-inch.

Rock Island Oil Co., Inc., Box 671, Duncan, Okla.

L. B. Simmons, *Pres.*; H. B. Alspaugh, *V. P.*; M. L. Simmons, *Sec.* and *Treas.*; G. C. Vaughn, *Supt.*; H. A. Sutherland, *Foreman.*

Rothschild Oil Co., Santa Fe Springs, Calif.

H. S. Rothschild, *Pres.*; Oscar Samuelson, *V. P.*; Josephine E. Rothschild, *Sec.* and *Treas.*; L. A. Whitlock, *Supt.* 5 miles, 5-inch.

Root Petroleum Co., Shreveport, La.

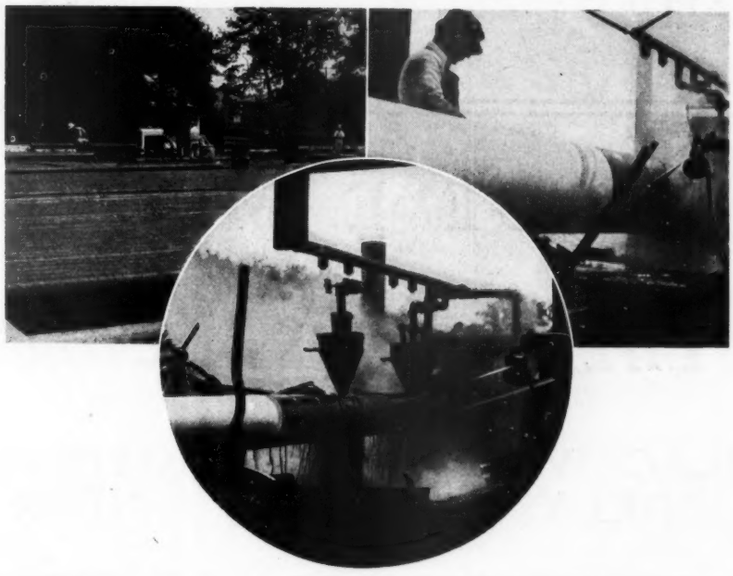
D. P. Hamilton, *Pres.*; H. Canon, *V. P.*; T. E. Beaird, *Sec.*; G. G. Moore, *Mgr. Pipe Line Dept.*; F. P. Peppard, *Asst. Mgr.*; J. C. Dagnell, *Supt.*; B. J. Ruddell, *Foreman*; I. L. Bennett, *Sta. Engr.* 39 miles, 4- and 6-inch.

Royalite Oil Co. (Pipe Line Division), 604 Second St., West, Calgary, Alberta, Canada

J. H. McLeod, *Pres.*; S. G. Coultis, *Gen. Mgr.*; T. E. Burns, *Sec.* and *Treas.*; T. W. Trotter, *Supt.*; H. L. Constable, *Asst. Supt.*; N. Tupper, *Pipe Line Foreman*; J. Keith, *Ch. Gauger.* 157 miles, 2- to 6-inch.

Rusk Oil & Refining Co., Box 270, Tyler, Tex.

H. H. Coffield, *Pres.*; George P. Mann, *V. P.*; J. H. Edwards, *Sec.* and *Treas.*



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S

Saxet Heights Pipe Line Co., 632 Bedell Bldg., San Antonio, Tex.

E. L. Buckley, *Pres.;* Marquis G. Eaton, *V. P.* and *Treas.;* Helen Sanders, *Sec.;* M. D. Atlgelt, Corpus Christi, Tex., *Gen. Supt.;* J. T. Riley, Corpus Christi, Tex., *Asst. Supt.;* Charles Crocker, Corpus Christi, Tex., C. W. Middleton, Bruni, Tex., *Foremen;* A. S. Zachry, Jr., *Ch. Clerk.* 53 miles, 4½-inch.

Shell Oil Co. (Pipe Line Department), 100 Bush St., San Francisco, Calif.

S. Belitcher, *Pres.;* G. H. Van Senden, J. U. Stair, E. F. Davis, W. P. Durkee, D. Heggie, *V. P.s;* A. R. Bradley, *Sec.;* D. Heggie, *Treas.;* F. B. Simms, 1008 W. Sixth St., Los Angeles, Calif., *Mgr.;* W. C. Roberts, 1008 W. Sixth St., Los Angeles, Calif., *Supt.;* M. C. Alcorn, 1008 W. Sixth St., Los Angeles, Calif., *Div. Supt.;* F. B. Jensen, 1008 W. Sixth St., Los Angeles, Calif., *Engr.;* E. W. Jenkins, Box 329, Tracy, Calif., *Div. Supt.;* H. H. McQueen, Box 329, Tracy, Calif., *Asst. Div. Supt.;* A. C. Grant, Box 329, Tracy, Calif., *Foreman Mach.;* V. C. Tiscornia, Box 329, Tracy, Calif., W. D. McBride, Box 999, Bakersfield, Calif., S. Shoberg, Bin "Q," Long Beach, Calif., H. J. Koeckes, Simi, Calif., *Div. Foremen;* M. L. Tisher, Box "A," Oilfields, Calif.; L. M. Parker, Box 578, Wasco, Calif., A. H. Berendsen, Box 303, Lost Hills, Calif., P. J. Shea, Box 999, Bakersfield, Calif., E. J. Martin, Sr., Box 897, Kettleman City, Calif., C. A. Brannum, Tranquillity, Calif., E. L. True, Box 248, Los Banos, Calif., C. Ashworth, Box 847, Crows Landing, Calif., R. E. Longwill, Box 329, Tracy, Calif., C. H. Jenkins, Box 68, Byron, Calif., *Sta. Foremen.* 625.32 miles, 4- to 12-inch.

Shell Pipe Line Corp., Shell Bldg., St. Louis, Mo.

R. G. A. van der Woude, New York, N. Y., *Chm. of Bd.;* Alexander Fraser, *Pres.;* R. P. Bascom, *V. P.;* J. W. Watson, *V. P.* and *Treas.;* Joe T. Dickerson, New York, N. Y., *Sec.;* C. S. Gentry, New York, N. Y., *Asst. Sec.;* P. R. Chenoweth, *Asst. Sec.* and *Asst. Treas.;* S. W. Duhig, New York, N. Y., *Asst. Treas.;* R. B. High, *Mgr.;* C. B. Singleton, *Pur. Agt.;* F. S. Leonard, *Supt. Tel.* and *Tel.;* S. A. Lesnett, F. D. Morgan, Tulsa, Okla., E. C. Morris, Houston, Tex., *Div. Supts. Tel.* and *Tel.;* A. K. Riddle, Cushing, Okla., *Gen. Supt.;* L. F. Young, Cushing, Okla., D. H. Lewis, Colorado, Tex., C. C. Ingram, Houston, Tex., *Supts.;* W. N. Le Sueur, Cushing, Okla., E. A. Dierdorff, Cushing, Okla., *Asst. Supts.;* James Stevenson, Harristown, Ill., *Acting Supt.;* P. J. Williams, Neosho, Mo., E. M. Owens, Greenwich, Kans., R. Floyd, Seminole, Okla., W. B. Sanders, Austin, Tex., D. E. Beaver, Kilgore, Tex., *Div. Supts.;* H. M. Hovis, Colorado, Tex.; C. D. Winkelman, McCamey, Tex., C. S. Ramsey, Kilgore, Tex., *Asst. Div. Supts.*

Simrall Corp., Mount Pleasant, Mich.

C. L. Maguire, *Pres.;* W. L. Davis, *V. P.;* S. M. Fasquelle, *Sec.;* H. J. Chopard, *Treas.;* D. Y. Hewitt, *Gen. Supt.;* Orah Courtney, *Asst. Supt.;* Norman Blundell, *Ch. Engr.;* Jay Parkhurst, *Maintenance Engr.;* Robert Rea, *Supt. West Branch Dist.;* T. N. Rutherford, *Supt. Buckeye, Edenville, Dist.;* William Haught, *Supt. Allegan Dist.* 130.7 miles, 2- to 6-inch.

Sinclair Refining Co., Pipe Line Department, Independence, Kans.

Earle Sinclair, New York, *Pres.;* C. H. Kountz, Box 460, Independence, Kans., Judge Edward H. Chamblier, Tulsa, Okla., *V. P.s;* J. R. Manion, *V. P.* and *Gen. Mgr.;* Charles Fitzgerald, Box 1990, Fort Worth, Tex., Frank Hadley, *Asst. to V. P.s;* M. E. Fannon, Box 418, Tulsa, Okla., *Exec. Dept.;* R. B. Hanna, *Asst. Sec.* and *Treas.;* K. L. Laufman, *Auditor;* C. R. Weidner, *Ch. Engr.;* J. J. Linehan, Box 418, Tulsa, Okla., C. E. McPoland, 1412 Commerce Bldg., Kansas City, Mo., W. R. Reed, A. D. Sloan, Box 1990, Fort Worth, Tex., *Gen. Supts.;* W. E. Morrison, Box 418, Tulsa, Okla., R. J. Tibbets, 1412 Commerce Bldg., Kansas City, Mo., *Asst. Gen. Supts.;* Leo F. McLaughlin, *Master Mech.;* D. R. Welch, *Supt. Tel.* and *Tel.;* H. E. Browne, 721 N. Penn Ave., *Asst. Supt. Tel.;* L. H. Angove, Box 350, Bowie, Tex., C. E. Christie, Box 711, Mexia, Tex., W. F. Conry, Box 418, Tulsa, Okla., R. B. Laughner, 414 Bondi Bldg., Galesburg, Ill., M. J. Loftus, J. D. Moroney, Box 1249, Bartlesville, Okla., Frank McFarland, 202 Morris Bldg., Mexico, Mo., Leo B. Smith, Box 1430, Wichita Falls, Tex., J. J. Stines, 1412 Commerce Bldg., Kansas City, Mo., H. Wallender, Box 748, Troup, Tex., *Div. Supts.;* B. N. Adkins, 421 N. Morrow St., Drumright, Okla., D. M. Cox, 601 E. Fourteenth St., Ada, Okla., A. H. Donnewald, 531 First National Bank Bldg., Wichita, Kans., R. J. Osborn, 324 Westminister, Dave Rike, Box 418, Tulsa, Okla., *Dist. Foremen.* 10,592 miles.

Skelly Oil Co., Skelly Bldg., Tulsa, Okla.

W. G. Skelly, *Pres.;* C. C. Herndon, W. T. Atkins, H. M. Stalcup, A. H. Hyden, *V. P.s;* J. F. Nagle, *Exec. Asst.* in *Chg.* of *Pipe Lines;* F. T. Hopp, *Sec.* and *Treas.;* S. G. Snyder, *Supt.;* G. E. Ault, *Dist. Foreman;* Rex L. Smith, *Supt's. Clerk* and *Ch. Strapper;* H. Wolf, S. Cannon, D. O. Confer, Harry Wahl, *Connection Foremen;* D. A. Kemmerly, *Ch. Dispatcher;* J. R. Cummings, *Sta. Ch. Engr.;* C. E. Manion, J. H. Williams, J. P. Sleeper, *Asst. Dispatchers* and *Clerks.* 696 miles.

Southern California Pipe Line System, Box 725, Wilmington, Calif.

F. E. Coyle, *Supt.*; G. A. Reeve, *Supt. of Shipments*; J. J. Murray, *Supt. San Pedro Marine Terminal*; E. A. Siddall, *Traveling Engr.*; F. H. Adams, *Ch. Engr.* 660.12 miles, 6- and 8-inch.

Southern Pipe Line Co., Oil City, Pa.

Allan T. Towl, *Pres.*; J. M. Tussey, *V. P.* and *Treas.*; T. C. Towl, Chamber of Commerce Bldg., Pittsburgh, Pa., *V. P.* and *Gen. Mgr.*; E. W. Ziegler, *Sec.*; L. J. Vandergrift, Lancaster, Pa., *Gen. Supt.* 269 miles.

Southern Pipe Line Corp., 411 N. Broadway, Corpus Christi, Tex.

H. A. Galt, *Pres.*; C. M. Brown, *V. P.*; J. H. Heroy, *Sec.*; F. W. Currier, *Treas.*; S. Maston Nixon, *Asst. to Pres.* and *Texas Mgr.*; D. H. Hancock, *Gen. Supt.*; J. L. Reed, *Asst. Supt.* 28 miles, 3- to 6-inch.

Southwest Pennsylvania Pipe Lines, Oil City, Pa.

Allan T. Towl, *Pres.*; J. M. Tussey, *V. P.* and *Treas.*; T. C. Towl, Chamber of Commerce Bldg., Pittsburgh, Pa., *V. P.* and *Gen. Mgr.*; W. H. Fisher, Washington, Pa., *Supt.* 1,826 miles.

Standard Oil Co. of California, 225 Bush St., San Francisco, Calif.

W. H. Berg, *Pres.*; H. D. Collier, R. W. Hanna, R. K. Davies, M. E. Lombardi, *V. P.s*; J. H. Tuttle, *Sec.*; V. F. Palmer, *Treas.* 207.2 miles, 6- to 12-inch.

Standard Oil Co. of Louisiana, Baton Rouge, La.

M. J. Rathbone, *Pres.*; M. W. Boyer, J. R. McWilliams, J. E. Skehan, *V.P.s*; S. W. Day, *V.P. in Chg. Pipe Lines*; J. A. Bechtold, *V.P.* and *Treas.*; S. E. Kidd, *Sec.*; J. A. Kunkle, *Gen. Supt.*; W. B. Fulton, *Ch. Engr.*; S. R. Simmons, *Asst. Gen. Supt.*; W. C. Taylor, *Material* and *Traffic*; W. G. Kelley, *Ch. Oil Dispatcher*; M. Chambers, *Supt. Tel* and *Tel.*; F. Coryell, *Master Mech.*; A. J. Curry, *Supt. of Automotive Equipment*; J. M. Ivy, *Safety Inspector*; R. E. Hughes, Oxford, La.; T. F. Welch, R.F.D., Minden, La., O. C. Day, Drawer C, Smackover, Ark., G. C. Rives, Rodessa, La., S. A. Sheppard, Sunset, La., *Dist. Foremen*; A. L. Wallace, E. E. Wasson, Ida, La., Wm. Steele, Oxford, La., F. J. Tunstead, Flora, La., J. A. Norwood, Bunkie, La., B. F. Morgan, Boyce, La., G. C. Holiaway, Melville, La., *Sta. Ch. Engrs.* 1,865.73 miles, 2- to 12-inch.

Standish Pipe Line Co., Bartlesville, Okla.

E. F. Guidinger, *Pres.*; J. R. Harris, *V. P.*; C. J. Logue, *Sec.* and *Treas.*; R. T. Conwell, Rt. 9, Box 190, Oklahoma City, Okla., E. V. Kile, Thrall, Kans., E. A. Ralston, Box 328, Phillips, Tex., *Supts.*; W. H. Wallace, Rt. 9, Box 190, Oklahoma City, Okla., W. K. Patrick, Rt. 2, Box 3-A, Kaw, Okla., D. R. Holloman, Box 328, Phillips, Tex., G. H. Kuepker, Box 1615, Pampa, Tex., C. J. Turner, Drawer T, Smackover, Ark., *Dist. Foremen*. 1,320 miles, 2- to 10-inch.

Stanolind Pipe Line Co., Tulsa, Okla.

R. S. Ellison, *Pres.*; E. G. Suebert, B. P. Sibole, *V. P.s*; A. L. Carlson, *Sec.* and *Treas.*; William G. Heltzel, *Gen. Supt.*; C. M. Scott, Jr., *Ch. Engr.*; J. B. Harshman, *Master Mech.*; J. J. Boyd, *Asst. Ch. Engr.*; F. P. O'Connor, *Supt. Tel. & Tel.*; S. M. Briscoe, *Supt. Right of Way*; J. L. Burke, *Traf. Mgr.*; Ray Harvey, *Ch. Oil Dispatcher*; A. M. Hill, *Supt. of Welding*; J. C. Stirling, *Corrosion Engr.*; Bert Martin, *Ch. Gauger*; J. L. Shoemaker, *Auditor*. 7,309 miles, 2- to 14-inch.

Stoll Oil Refining Co., Louisville, Ky.

60 miles, 4-inch. Line abandoned.

Sun Pipe Line Co. (Delaware), 1608 Walnut St., Philadelphia, Pa.

J. N. Pew, Jr., *Pres.*; Frank L. Hadley, J. Edgar Pew, *V. P.s*; Frank Cross, *Sec.* and *Treas.*; B. K. Morse, *Ch. Engr.*; Dr. J. M. Pearson, *Physicist*; Raymond F. Hadley, *Elec. Engr.*; James E. Ford, R.F.D. 1, Honey Brook, Pa., F. H. Guthrie, 313 Archie St., Oakmont, Allegheny County, Pa., *Div. Supts.* 851.65 miles, 2- to 8-inch.

T

Talco Pipe Line Co., 510 Continental Bldg., Dallas, Tex.

J. F. Lucey, *Pres.*; Ralph E. Fair, D. Harold Byrd, Jack Frost, *V. P.s*; J. L. Lobdell, *Sec.* and *Treas.*; C. L. Todd, Talco, Tex., *Dist. Supt.*; Henry F. Smith, Talco, Tex., *Foreman*; John Beckett, Verna J. Braden, Palmer H. Jones, Joe Rushing, all of Talco, Tex., *Sta. Engrs.*

Texas-Empire Pipe Line Co., The, Houston, Tex.

B. E. Hull, *Pres.*; F. A. Stivers, *V. P.* and *Gen. Supt.*; A. N. Horne, *V. P.*; H. L. Stewart, *Sec.* and *Treas.* 1,300 miles.

Texas-Empire Pipe Line Co. of Texas, The, Tulsa, Okla.

F. A. Stivers, *Pres.* and *Mgr.*; A. N. Horne, G. R. Kinter, *V. P.s*; H. L. Stewart, *Sec.* and *Treas.* 209.11 miles, 12-inch.

Texas Pipe Line Co., The, Houston, Tex.

B. E. Hull, *Pres.* and *Mgr.*; A. S. Bailey, *V. P.* and *Asst. Mgr.*; T. J. McMahon, *V. P.* and *Supt. of Oper.*; R. B. McLaughlin, *Sec.* and *Treas.* 4,354 miles.

Texas Pipe Line Co. of Oklahoma, Houston, Tex.

J. K. McGoldrick, *Pres.*; B. E. Hull, J. H. Hill, *V. P.s*; H. L. Stewart, *Sec.* and *Treas.* 1,317 miles.

Texas-New Mexico Pipe Line Co., P. O. Box 2332, Houston, Tex.

B. E. Hull, *Pres.* and *Mgr.*; A. S. Bailey, *V. P.* and *Asst. Mgr.*; J. R. Manion, Ira McFarland, *V. P.s*; R. B. McLaughlin, *Sec.* and *Treas.* 1,013 miles.

Thurber Pipe Line Co., Fort Worth National Bank Bldg., Fort Worth, Tex.

J. R. Penn, *Pres.*, John Hancock, R. J. Fleckenstein, *V. P.s*; R. Seibel, *Sec.* and *Treas.*; C. H. Martin, *Supt.*; W. M. Brown, *Asst. Supt.*; C. C. Mitchell, W. W. Mitchell, Gale Smith, William McGinis, *Gaugers*; W. V. Sinclair, E. B. Williams, *Sta. Engr.*; J. C. Davis, *Pur. Agt.* 108 miles, 2- to 5 3/16-inch.

Tidal Pipe Line Co., 17 Battery Place, New York, N. Y.

E. L. Shea, *Pres.*; E. H. Salrin, Houston, Tex., G. R. Kinter, Tulsa, Okla., *V. P.s*; Y. P. Bromme, Tulsa, Okla., *Sec.*; K. R. Hankinson, *Treas.*; C. F. Guinn, Tulsa, Okla., *Oil Supt.* 500.6 miles.

Tide Water Associated Oil Co., Associated Division, 79 New Montgomery St., San Francisco, Calif.

William F. Humphrey, *Pres.*; L. F. Bayer, L. C. Decius, B. I. Graves, L. D. Jurs, *V. P.s*; J. P. Edwards, *Exec. Sec.*; W. A. Sloan, *Regional Treas.*

Tide Water Pipe Line Co., Ltd., The, 17 Battery Place, New York, N. Y.

G. J. Hanks, *Pres.*; J. Z. Van Tine, *V. P.* and *Gen. Mgr.*; M. D. Harris, *V. P.*; C. W. Morrison, *Sec.*; K. R. Hakinson, *Treas.*; W. J. Burker, *Asst. Sec.* and *Asst. Treas.*; E. W. Duggan, *Supt.*; D. W. Ward, *Pur. Agt.* 832 miles, 6-inch.

Toronto Pipe Line Co., The, Philtower Bldg., Tulsa, Okla.

A. L. Ellsworth, *Pres.*; William K. Whiteford, *Exec. V. P.*; J. C. Millar, *V. P.* and *Treas.*; Mayo E. McKeown, *Sec.*; C. M. Bryson, *Gen. Supt.*; A. M. Felsman, 601 Citizens National Bldg., Tyler, Tex., T. A. Branch, Box 937, Cut Bank, Mont., *Div. Supts.*; G. J. Blackard, Box 206, Arp, Tex., *Ch. Gauger*. 116.710 miles, 2- to 8-inch.

Transit & Storage Co., 208 Sperry Bldg., Port Huron, Mich.

P. R. Naylor, *Pres.*; J. R. Simpson, *V. P.*; George Kelting, *V. P., Sec.* and *Treas.*; B. E. Ireson, *Asst. Sec.* and *Treas*; Harry Wheatley, Wayne, Mich., E. F. Cassidy, Shelby, Mont., *Supts.* 333.74 miles, 2- to 8-inch.

Transport Oil Co., 4323 S. Western Blvd., Chicago, Ill.

P. B. Flynn, *Pres.*; I. G. Abney, *V. P.*; R. S. Watt, *Sec.* and *Treas.*; Nolan Williams, P. O. Box 190, Oil City, La., *Supt.* 7 miles, 4-inch.

U

Union Oil Co. of California, 617 W. Seventh St., Los Angeles, Calif.

L. P. St. Clair, *Pres.*; R. D. Matthews, *Exec. V. P.*; W. W. Orcutt, W. L. Stewart, Jr., Paul M. Gregg, A. C. Galbraith, *V. P.s*; G. H. Forster, *Comptroller*; A. B. Mason, A. H. Hand, M. G. Kerr, *Asst. Comptrollers*; W. R. Edwards, *Sec.*; J. M. Rust, *Treas.*; E. H. Estill, *Asst. Sec.*; A. C. Marshall, H. W. Sanders, *Asst. Treasrs.*; William Groundwater, *Dir. Trans.*; W. W. Hay, *Mgr. Pipe Line Oper.*; Lafe Todd, San Luis Obispo, Calif., *Gen. Supt. Pipe Lines*; R. V. Rosborough, San Luis Obispo, Calif., J. H. Robinson, Brea, Calif., *Supts.* 911 miles, 2- to 12-inch.

United Oil Pipe Line Co., Houston, Tex.

N. C. McGowen, Shreveport, La., *Pres.*; R. H. Hargrove, B. M. Nowery, *V. P.s*; S. L. Davis, *Comptroller*; J. H. Miracle, *Sec.* and *Asst. Treas.*; A. L. McClellan, *Treas.* and *Asst. Sec.*; R. E. Hull, *Gen. Auditor*; W. F. Hartwig, Shreveport, La., *Supt.*; R. W. Ransom, Shreveport, La., *Asst. Supt.* 153.44 miles, 4- to 8-inch.

United Oil Pipe Line Co., Rusk Bldg., Houston, Tex.

N. C. McGowen, *Pres.*; R. H. Hargrove, B. M. Nowery, *V. P.s*; J. H. Miracle, *Sec.*; A. L. McClellan, *Treas.*; W. F. Hartwig, Shreveport, La., *Gen. Supt.*; M. Ransom, Shreveport, La., *Asst. Supt.* 68.44 miles, 8-inch.

Upshur Pipe Line, Gladewater, Tex.

P. H. Pewitt, *Pres.*; J. R. McGee, *Sec.*; L. M. Daugherty, *Supt.*; J. A. Wade, *Foreman*. 14 miles, 4-inch.

V

Valley Pipe Line Co., 417 S. Hill St., Los Angeles, Calif.

C. P. Watson, *Pres.*; L. R. Holmes, *V. P.*; A. W. Mitchem, *Sec.*; W. A. Russell, *Treas.*; W. H. Lawrence, Morro Bay, Calif., *Supt.* 72 miles, 10-inch.

Valvoline Oil Co., Cincinnati, Ohio

G. P. Doll, *Pres.*; C. W. Luton, H. M. Hart, *V. P.s*; C. J. Leroux, *V. P.* and *Treas.*; C. C. Gould, *Sec.*; Clark Karns, *Mgr. Pipe Lines*; J. J. Dunlery, *Asst. Mgr. Pipe Lines*; Roman Sailor, *Asst. Engr.* 1,800 miles, 2- to 4-inch.

Vickers Petroleum Co., The, Wichita, Kans.

J. A. Vickers, *Pres.*; C. L. Henderson, *V. P.*; John S. Wertz, *Sec.* and *Treas.*; H. G. Shaw, *Traf.* and *Pur. Mgr.*; C. N. Davis, *Pipe Line Supt.* 65 miles, 3- and 4-inch.

W

Webb County Gathering System, Inc., Smith-Young Tower, San Antonio, Tex.

H. M. Reed, *Pres.*; B. C. Boilberg, *V. P.*; Grace Miller, *Sec.* and *Treas.*; J. G. McIntosh, 538 Southern Street, Corpus Christi, Tex., O. D. Riddle, Hebbronville, Tex., *Supts.* 4 miles, 4-inch.

West Texas Refining Co., Dallas, Tex.

F. W. Burford, *Pres.*; John J. Thomas, *V. P.*; John R. Scott, *Sec.*; E. V. Campbell, *Treas.*; J. W. Lamar, Kermit, Tex., *Supt.* 51 miles, 4- and 6-inch.

Wabash Pipe Line Co., Chicago, Ill.

D. D. Irwin, *Pres.*; Henry Hauseman, *V. P.*; J. W. Meehan, Olney, Ill., *Oper. V. P.*; C. H. Jay, *Sec.*; J. H. Jay, *Treas.*; J. H. Botkin, *Comptroller*; F. Thrasher, Olney, Ill., *Supt.* 47 miles, 8- and 10-inch.

Wilcox, H. F., Oil & Gas Co., Sixth and Denver Sts., Tulsa, Okla.

Homer F. Wilcox, *Pres.*; F. H. Dunn, *V. P.*; M. P. Appleby, *V. P.* and *Treas.*; C. L. Miller, *Sec.*; J. L. Keefe, *Asst. Sec.*; William Bingham, *Constr. Engr.*; W. M. Fraser, Bristow, Okla., E. E. Holden, Pampa, Tex., *Supts.*

Wood-Moore Corp., Port Lavaca, Tex.

Receivership.

Y

Yount-Lee Pipe Line Co., Tulsa, Okla.

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A

Acme Natural Gas Co., 161 Market St., Leechburg, Pa.

J. C. Wally, *Pres.;* F. H. Crosby, *Sec.* and *Treas.* 1 mile 2-inch.

Allegheny Butler Gas & Oil Co., 16 E. Center St., Danville, Pa.

W. D. Smith, *Pres.;* M. P. Smith, *Sec.;* H. J. Smith, *Treas.;* W. D. Smith, Gibson, Pa., *Supt.* 3 miles.

Amarillo Oil Co., P. O. Box 637, Amarillo, Tex.

N. K. Moody, Tulsa, Okla., *Pres.;* R. E. Wertz, E. C. Wagner, C. W. Trapp, Kansas City, Mo., P. C. Spencer, New York, N. Y., W. A. Vinson, Houston, Tex., *V. P.s.;* George Baird, New York, N. Y., *Sec.* and *Treas.;* W. W. Rusk, *Ch. Engr.;* E. C. Wagner, *Gen. Supt.;* R. L. Dever, *Supt.;* A. F. Cox, *Gas Engr.;* T. R. Cross, *Pur. Agt.* 70.32 miles.

Ambridge Gas Co., 467 Maplewood Ave., Ambridge, Pa.

F. C. Schroeder, *Pres.* and *Treas.;* R. H. McCague, *V. P.;* F. C. Schroeder, Jr., *Sec.;* W. D. Ashenhart, *Mgr.* 5½ miles, 2- to 6-inch.

American-Michigan Pipe Line Co., Muskegon, Mich.

Glenn R. Chamberlain, *Pres.;* Dean W. Flowers, *V. P.;* G. J. Zorn, *Sec.* and *Treas.;* Harry Gabel, Alma, Mich., *Field Supt.* 52 miles, 6- and 8-inch.

Arkansas-Louisiana Gas Co., Shreveport, La.

Vacant, *Pres.;* D. W. Harris, *V. P.* and *Gen Mgr.;* H. D. Hancock, J. R. Munce, *V. P.s;* A. H. Weyland, *V. P.* and *Gen. Supt.;* T J. Heard, *Sec.;* B. R. Muirhead, *Treas. Pipe Line Division;* W. H. Buckley, *Supt.;* R. P. Gonzales, *Asst. Supt.;* W. E. Nester, *Comp. Sta. Supt.;* Earl Kightlinger, *Measure Supt.;* F. S. Kelly, Jr., *Ind. Engr.;* R. H. Johnston, *Ch. Dispatcher;* T. L. Holcombe, *Ch. Clerk;* W. A. Long, Dist. No. 1., L. W. Young, Dist. No. 2, Jim Griffith, Dist. No. 3, *Supts.; Gas Distribution Div.;* W. M. Little, *Gen. Supt.;* Carroll Diller, *Maintenance* and *Constr. Supt.;* M. J. Jackson, *Supvr. Meter Shops;* George C. Hearn, *Supvr. of Leakage;* D. H. Thurston, El Dorado, Ark., N. J. Kroencke, Texarkana, Ark., F. D. Shanks, Pine Bluff, Ark., C. H. Thorpe, Little Rock, Ark., *Mgrs.;* W. S. Tobey, Little Rock, Ark., Bert Smith, *Supts.;* W. A. Adams, *Engr.* 1,434 miles, 2- to 20-inch.

Arkansas Natural Gas Corp., Shreveport, La.

H. L. Doherty, *Pres.;* W. A. Jones, F. R. Coates, T. I. Carter, J. R. Munce, *V. P.s;* D. W. Harris, *V. P.* and *Gen. Mgr.;* T. J. Heard, *Sec.;* B. R. Muirhead, *Treas.;* W. H. Buckley, *Supt.;* Paul Weeks, *Prod. Supt.;* J. Lucas, *Pur. Agt.;* H. T. Goss, *Ch. Engr.*

Arkansas Western Gas Co., Burt Bldg., Dallas, Tex.

Albert S. Johnson, *Pres.;* L. L. Baxter, F. W. Smith, *V. P.s;* C. H. Zachry, *V. P.* and *Treas.;* H. V. McConkey, *Sec.;* J. C. Reid, *Gen. Supt.;* Hampton Halsell, Fayetteville, Ark., *Ind. Engr.;* John Dunsen, Fayetteville, Ark., *Main Line Foreman;* L. L. Baxter, Fayetteville, Ark., *Div. Mgr.;* W. S. McMichael, Siloam Springs, Ark., W. Dalton, Bentonville, Ark., E. Allumbaugh, Rogers, Ark., Carl Watson, Springdale, Ark., *Local Mgrs.;* F. D. Bradley, *Pur. Agt.* 208 miles, 10¾-inch and smaller.

B

Bellewood & Monongahela City Natural Gas Co., 113 Fourth St., Monongahela, Pa.

Robert W. Byers, *Pres.;* E. W. Gibbons, *V. P.* and *Gen. Mgr.;* R. E. Byers, *Sec.;* George B. Scott, *Treas.;* William E. Leathers, *Supt. of Trans.* and *Dist.;* George A. Pfeifer, *Supt. of Prod.;* Weaver L. Bush, *Engr.* 59 miles.

Big Horn Gas Co., Basin, Wyo.

P. G. Weidner, *Pres.;* John McFadyen, Casper, Wyo., *V. P.;* John F. Cullen, Casper, Wyo., *Sec.;* T. K. Bishop, *Treas.;* L. G. Merriott, *Supt.* and *Asst. Sec.;* I. E. Spencer, *Foreman;* Charles O. Bailey, Grass Creek, Wyo., *Sta. Engr.* 85 miles, 8- to 14-inch.

Billings Gas Co., The, Billings, Mont.

W. M. Holland, Casper, Wyo., *Pres.;* J. E. Moore, *V. P.;* C. A. Trowbridge, *Sec.;* J. A. Lee, Casper, Wyo., *Treas.;* E. C. Neilson, *Supt. of Distribution;* I. O. Pearl, Bridger, Mont., *Constr. Supt.* 196 miles, 1- to 12-inch.

C

Cabot, Godfrey L., Inc., and Subsidiaries, 77 Franklin St., Boston, Mass.

Godfrey L. Cabot, *Pres.;* Ralph Bradley, Edmund Billings, *V.P.s;* Fred C. Fernald, *Sec.;* Thomas D. Cabot, *Treas.;* Hugh Burdette, Union Bldg., Charleston, W. Va., *Eastern Mgr.;* R. G. Allen, Pampa, Tex., *Western Mgr.;* W. P. Smith, Union Bldg., Charleston, W. Va., George Cash, Olean, N. Y., *Gen. Supts.;* F. M. Neely, Wickett, Tex., *Gaso. Plant Supt.* 1,020 miles, 2- to 24-inch.

Canadian River Gas Co., Colorado Springs, Colo.

N. K. Moody, Tulsa, Okla., *Pres.;* P. C. Spencer, New York, N. Y., Albert R. Jones, Kansas City, Mo., R E. Wertz, Amarillo, Tex., *V. P.s;* George Baird, New York, N. Y., *Sec.* and *Treas.;* Robert W. Hendee, *Gen. Mgr.;* L. B. Whitefield, *Pur. Agt.;* R. A. Ford, Amarillo, Tex., *Gen. Supt.;* Max K. Watson, Amarillo, Tex., *Asst. Gen. Supt.;* R. W. Miller, Amarillo, Tex., *Field Line Supt.;* L. W. Jackson, Channing, Tex., *Supt.* 230 miles, 2- to 22-inch.

Canadian Western Natural Gas, Light, Heat & Power Co., Ltd., The, 215 Sixth Ave., West, Calgary, Alberta, Canada

H. R. Milner, *Pres.;* E. W. Bowness, *V. P. in Chg. of Oper.;* H. S. Watts, *Sec.* and *Treas.;* P. D. Mellon, *Gen. Supt.* and *Ch. Engr.;* F. J. Heuperman, *Asst. Supt.* and *Engr.;* W. J. Gray, *Supt. of Calgary Distribution;* E. Coleman, *Gen. Foreman of Distribution;* T. Dodds, *Ser. Foreman;* F. R. Harrison, 11th Ave. and 10th. St., W., *Supt. of Trans.;* George Robinson. J. G. Wise, 11th and 10th St., W., *Trans. Line Foremen;* H. W. Francis, *Pur. Agt.;* R. Lalonde, Burdett, Alta.; *Field Foreman.* 630 miles, 1½- to 18-inch.

Canton Municipal Utilities, Canton, Miss.

W. M. Reid, *Supt.* 21 miles, 6-inch.

Carnegie Natural Gas Co., 1014 Frick Bldg., Pittsburgh, Pa.

S. W. Meals, *Pres.;* McGilvray Shiras, *V. P.;* J. W. Hamilton, *Sec.;* H. T. Hamilton, *Asst. Treas.;* Clarence Sweeney, *Gen. Supt.;* H. J. Hess, *Pipe Line Supt.;* H. A. Lowers, Munhall, Pa., Paul D. Inghram, Waynesburg, Pa., Rex. P. Milliken, Mannington, W. Va., J. Y. Dentzel, Leechburg, Pa., *Div. Supts.;* N. K. Clements, Leechburg, Pa., W. O. Spitznogle, Hundred, W. Va., *Ch. Engrs.*

Central Gas Utilities Co., The, Abilene, Kans.

W. S. Morrison, *Pres.;* R. B. Gemmill, *V.P.;* M. C. Beamer, *Sec.;* O. D. Small, *Treas.;* Joe Murray, *Engr.;* Ross Beach, Hays, Kans., H. E. Waring, Lamar, Colo., *Dist. Mgrs.* 270 miles, 4- to 8-inch.

Central States Power & Light Corp. and Subsidiaries, Tulsa, Okla.

B. F. Pickard, *Pres.;* W. F. Hebeler, *V. P.* and *Gen. Mgr.;* E. C. Brown, *Treas.;* P. K. Sticelber, *Div. Mgr. (Gas Prod.* and *Trans.);* W. R. Kubista, *Gas Engr.;* E. C. Wetter, *Pur. Agt.;* C. A. Hummel, *Ch. Engr.;* A. H. Burgess, Henryetta, Okla., C. H. Rich, Clinton, Okla., R. W. Thatcher, Stillwater, Okla., La Van Warren, Quinton, Okla., *Dist. Mgrs.;* C. A. Harmon, Shidler, Okla., *Supt.;* J. W. Garman, Pampa, Tex., *Dist. Mgr.* 760 miles, 2- to 10-inch.

Cherokee Public Service Co., Wagoner, Okla.

Ed Blieden, *Trustee;* J. R. Johnston, *Mgr.;* J. J. Cobb, *Supt.* 46 miles, 2- to 8-inch.

Cimarron Utilities Co., Borger, Tex.

Chester C. Smith, *Pres.;* G. T. Shoemaker, Streeter B. Flynn, *V. P.s;* H. C. Davis, *Sec.* and *Treas.;* C. R. Stahl, *Gen. Mgr.;* K. E. Sharp, Texhoma, Okla., *Supt.;* D. D. Meredith, Boise City, Okla., C. B. Lisman, Hooker, Okla., Carl Kerr, Beaver, Okla., J. H. Settles, Texhoma, Okla., *Local Mgrs.*

Cities Service Gas Co., Bartlesville, Okla.

H. R. Straight, *Pres.;* A. W. Ambrose, *V. P.;* C. E. Murray, *V. P.* and *Sec.;* George H. Baird, *Div. Mgr.;* H. B. Milam, *Pipe Line Supt.;* F. D. Renfro, *Comp. Sta. Supt.;* C. A. Gibson, *Gas Measurement Supt.;* G. C. Roth, *Off. Mgr.;* W. T. Watters, Commerce, Okla., Ray Taylor, Joplin, Mo., H. S. German, Caney, Kans., T. R. Clements, Drumright, Okla.; Jess Prisock, Tallant, Okla., H. N. Peters, Ellsworth, Kans., J. W. Jones, Wichita, Kans., C. S. Smith, Okemah, Okla., Roy Corn, Independence, Kans., F. M. Sweazy, Chanute, Kans., Henry Peak, Kansas City, Kans., Charles Short, Lawrence, Kans., K. W. Wiand, Oklahoma City, Okla., S. W. Hunsaker, Blackwell, Okla., Burr Wiand, Emporia, Kans., Harry McDaniel, Wichita, Kans., C. A. Cole, Mooreland, Okla., L. M. Batten, Pampa, Tex., W. P. Benedict, Warrensburg, Mo., *Div. Supts.* 14,775 miles, 2- to 24-inch.

Colorado Interstate Gas Co., Room 2800, 30 Rockefeller Plaza, New York, N. Y.

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Colorado-Wyoming Gas Co., 407 Continental Oil Bldg., Denver, Colo.

H. D. Hancock, *Pres.;* C. J. Shortess, W. A. Jones, *V. P.s;* H. P. Davis, *Sec.;* E. H. Johnston, *Treas.;* W. L. Thackrey, *Gen. Supt.;* W. J. Giddings, *Meas. Engr.;* George C. Grill, Box 248, Arvada, Colo., *Comp. Supt.* 194.42 miles, 2- to 10-inch.

Columbia Gas & Electric Corp., 61 Broadway, New York, N. Y., and Principal Active Companies Including Atlantic Seaboard Corp., Binghamton Gas Works, Bracken County Gas Co., Central Kentucky Natural Gas Co., The Cincinnati Gas & Electric Co., Cincinnati Gas Transportation Co., The Cincinnati, Newport & Covington Railway Co., Columbia Corp., Columbia Engineering Corp., Cumberland & Allegheny Gas Co., The Dayton Power & Light Co., Eastern Pipe Line Co., Fayette County Gas Co., Gettysburg Gas Corp., Greensboro Gas Co., The Hamilton Service Co., The Harrison Electric & Water Co., Home Gas Co., Huntington Gas Co., Indiana Gas Distribution Corp., The Keystone Gas Co., Inc., The Loveland Light & Water Co., Manufacturers Gas Co., The Manufacturers Light & Heat Co., Miami Power Corp., Michigan Gas Transmission Corp., Natural Gas Co. of West Virginia, The Northwestern Ohio Natural Gas Co., The Ohio Fuel Gas Co., Pennsylvania Fuel Supply Co., Point Pleasant Natural Gas Co., The Union Light, Heat & Power Co., United Fuel Gas Co., Warfield Natural Gas Co.

Philip G. Gossler, *Chm. of Bd.;* Walter C. Beckjord, *Chm. Exec. Comm., V. P.* and *Gen. Mgr.;* Edward Reynolds, *Pres.;* Thomas B. Gregory, *Hon. V. P.;* Hubert C. Blackwell, Paul S. Clapp, Robert H. Delafield, Thomas R. Weymouth, W. Winans Freeman, Harry A. Wallace, Chauncey I. Weaver, *V. P.s;* Howland H. Pell, Jr., *Sec.;* Andrew J. Newman, *Treas.;* Jacob R. Harvin, David E. Mitchell, *Asst. Secs.;* H. Edwin Olson, *Asst. Treas.;* Francis B. Flahive, *Comptroller.* Operating Group Executives: Charles E. Bennett, *Pres., Pittsburgh Group Companies;* Hubert C. Blackwell, *Pres., Cincinnati Group Companies;* Oliver S. Hagerman, *Pres., Seaboard Group Companies;* Chauncey I. Weaver, *Pres., Columbus Group Companies;* Irving K. Peck, *Pres., Binghamton Group Companies;* Frank M. Tait, *Pres., Dayton Group Companies;* Harry A. Wallace, *Pres., Charleston Group Companies.*

Columbia Natural Gas Co., The, 545 William Penn Way, Pittsburgh, Pa.

J. French Robinson, *Pres.;* S. C. Preston, *V. P.;* S. E. W. Burnside, *Sec.;* S. J. Ratcliffe, *Treas.;* E. W. Williamson, *Mgr.;* L. E. Ostrye, *Supt.* 269.55 miles, 1- to 14-inch.

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Logan W. Cary, *Pres.;* E. C. Joullian, *V. P.;* Conrad C. Mount, *Sec.;* J. W. Metcalfe, *Treas.;* C. S. Worley, *Gen. Supt. Comp. Sta.* and *Pur. Agt.;* C. B. Day, Blackwell, Okla., Paul S. Pierson, Lawton, Okla., W. C. Burris, Weatherford, Okla., C. D. Reasor, Wichita, Kans., J. B. Owens, Neodesha, Kans., V. W. Hall, Winfield, Kans., *Div. Mgrs.* 1,400 miles, 2- to 12-inch.

Cut Bank Gas Utilities, Spokane, Wash.

Jerome L. Drumheller, *Owner;* D. M. Drumheller, Jr., *Mgr.* 19 miles, 2- to 4-inch.

D

Del Rey Oil & Gas Co., Washington St. and Beach Ave., Venice, Calif.

A. E. Schiltz, *Pres.;* F. A. E. Lowell, *V. P.* and *Supt.,* H. W. Wright, *Sec.;* H. A. Wohlenberg, *Asst. Sec.*

Dominion Natural Gas Co., Ltd., The, 518 Jackson Bldg., Buffalo, N. Y.

Henry L. Doherty, *Pres.;* S. B. Severson, *V. P.;* J. A. Richie, *Sec.* and *Treas.;* C. M. Sieger, Hamilton, Ontario, Canada, F. D. Howell, Brantford, Ontario, Canada, C. H. Lutz, Dunnville, Ontario, Canada, C. F. Henderson, St. Catherines, Ontario, Canada, L. D. Burdick, St. Thomas, Ontario, Canada, *Supts.;* W. M. Hott, *Meter Engr.;* G. M. Merrill, *Gas Engr.;* J. E. Whitaker, Brantford, Ontario, Canada, *Asst. Meter Engr.;* E. Stammers, Hamilton, Ontario, Canada, John Mercer, Brantford, Ontario, Canada, A. R. Lamberton, Dunnville, Ontario, Canada, H. E. Gilmore, St. Catherines, Ontario, Canada, Frank Kondal, St. Thomas, Ontario, Canada, *Foremen.* 1,210.542 miles, 2- to 12-inch.

E

East Ohio Gas Co., The, 1405 E. Sixth St., Cleveland, Ohio

C. E. Gallagher, *Pres.;* J. J. McMahon, *V. P.;* W. G. Rogers, *Sec.* and *Treas.;* W. G. Hagan, *Asst. Gen. Mgr.;* G. W. Horsley, *Gen. Supt.;* G. P. Binder, *Plant Supt.;* J. F. Gray, *Ch. Engr.;* A. T. Code, *Pur. Agt.* 6,465 miles, ⅝- to 36-inch.

El Paso Natural Gas Co., Bassett Tower, El Paso, Tex.

Paul Kayser, *Pres.;* C. C. Cragin, *V. P.* and *Gen. Mgr.;* A. J. Forbes, Jr., *V. P.* and *Gen. Supt.;* J. E. Franey, *Sec.* and *Treas.;* A. C. Martch, *Asst. Sec.* and *Asst. Treas.;* C. L. Perkins, *Supt. of Trans.;* D. H. Tucker, *Supt. of Meas.;* W. H. Miller, *Supt. of Compr. Sta.;* C. L. Moore, *Asst. Supt. of Compr. Sta.;* J. F. Schaffer, *Constr. Pipe Line Supt.;* H. F. Steen, Jal, New Mex., *Field Supt.;* J. F. Eichelmann, *Ch. Engr.;* W. A. Mullane, *Engr.;* J. M. Stricklin, *Ch. Dispatcher;* E. L. Woody, Comp. Sta. No. 1, Malaga, New Mex., J. A. Crutcher, Comp. Sta. No. 2, El Paso, Tex., E. A. Scearce, Comp. Sta. No. 3, El Paso, Tex., A. E. Carr, Comp. Sta. No. 4, Gage, New Mex., F. L. Anderson, Comp. Sta. No. 5, Douglas, Ariz., E. L. Chapman, Comp. Sta. No. 6, Benson, Ariz., *Ch. Operators;* John M. Newberry, Malaga, New Mex., N. W. Meador, El Paso, Tex., Paul C. Wright, El Paso, Tex., L. A. Coussons, Gage, New Mex., L. M. Stricklin, Douglas, Ariz., R. W. Walsh, Tucson, Ariz., E. W. Woody, Casa Grande, Ariz., *Div. Foremen.* 1,073.52 miles, 2⅝- to 16-inch.

Empire Southern Gas Co., 402 T. & P. Bldg., Fort Worth, Tex.

R. W. Rea, *Pres.* F. H. Coughlin, *V. P.;* James A. Davis, *V. P.* and *Gen. Mgr.;* J. G. McClellan, *Sec.* and *Treas.;* Big Spring, Tex. Dist.: J. P. Kenney, *Dist. Mgr.;* F. C. Landers, Jr., *Dist. Supt.;* L. A. Clawson, *Foreman;* C. L. Ponder, *Comp. Sta. Engr.;* Brady, Tex., Dist.: Ernst Tetens, *Dist. Mgr.;* H. M. Mastin, *Supt. Brady Oper.;* Lem Woods, *Supt. Gorman Oper.;* Minden, La., Dist.: Jasper Goodwill, *Dist. Mgr.;* J. S. Shinn, *Dist. Supt.* 153 miles, 4- to 8⅝-inch.

Equitable Gas Co., 435 Sixth Ave., Pittsburgh, Pa.

F. R. Phillips, *Pres.;* F. F. Schauer, *V. P.;* Joseph McKinley, *V. P. in Chg. Sales;* C. S. Mitchell, *Controller;* W. B. Carson, *Sec.;* C. J. Braun, Jr., *Treas.;* D. P. Hartson, *Oper. Mgr.;* T. H. Kendall, *Gen. Supt. of Distribution;* J. Bonsall, Union Bank Bldg., Clarksburg, W. Va., *Supt. Compr. Sta.;* H. H. Pigott, *Gen. Supt. Prod.* and *Trans.;* J. M. Shields, *Land Agt.* 2,547.24 miles, 1- to 36-inch.

F

Fidelity Gas Co., Aliquippa, Pa.

W. S. Kidd, Jr., *Pres.;* W. A. Blis, *V. P.* and *Treas.*

Ford, Mrs. H. L., Barnes, Pa.

Mrs. H. L. Ford, *Owner.* 6 miles, 1- to 2-inch.

Fort Smith Gas Co., 23 N. Eighth St., Fort Smith, Ark.

A. B. Harper, *Pres.;* S. R. Walker, *V. P.;* R. A. DeLong, *Sec.;* John W. Bell, *Treas.;* S. R. Walker, *Pur. Agt.;* John Henson, *Constr. Supt.;* John W. Bell, *Auditor.*

Frankfort Kentucky Natural Gas Co., Lexington, Ky.
D. L. Hazelrigg, *Pres.*; Joseph E. Harting, *V. P.*; T. J. Tonkin, Jr., *Sec.* and *Treas.*

G

Gas Oil Products, Inc., 45 S. Third St., Oxford, Pa.
John H. Ware, Jr., *Pres.*; John H. Ware, III, *V. P.* and *Treas.*; Willard M. Ware, *V. P.*; L. J. Ostermayer, *Sec.*; Le Roy A. Baker, *Plant Supt.*; Mark O. Haines, H. E. Kendall, Wester Wenrich, Earle A. Leonard, Preston Meibaum, John W. Heiney, *Branch Mgrs.* 32 miles, 2- to 4-inch.

H

Hamilton Gas Co., Charleston, W. Va.
Company now in receivership. W. A. Larner, *Pres.*; B. A. Wise and A. F. McCue, *Trustees*; J. M. Dolan, *Gen. Supt.* 120 miles, 2- to 8-inch.

Healdton Pipe Line Corp., Tradesmen Bank Bldg., Oklahoma City, Okla.
J. H. Keefe, Chicago, Ill., *Pres.*; H. L. Briggs, *V. P.* and *Gen. Mgr.*; C. W. Sowle, *Sec.*; J. W. Price, *Treas.*

Home Pipe Line Co., First National Bank Bldg., Cushing, Okla.
Andrew W. Little, *Pres.*; L. D. Gaunt, *V. P.*; Harry Melzl, *Sec.* and *Treas.*; H. T. Eagle, *Field Supt.* and *Gas. Engr.* 5½ miles, 2- to 6-inch.

Hope Natural Gas Co., 545 William Penn Way, Pittsburgh, Pa.
Howell C. Cooper, *Pres.* and *Gen. Mgr.*; L. L. Tonkin, *V. P.* and *Ch. Engr.*; J. C. Chisler, *V. P.* and *Treas.*; S. E. W. Burnside, *Sec.*; W. B. Gribble, Box 1951, Clarksburg, W Va., *Gen. Supt.*; C. C. Reed, Box 1951, Clarksburg, W. Va., *Asst. Gen. Supt.*; L. G. Kincheloe, Box 1951, Clarksburg, W. Va., *Supt. Main Lines*; J. G. Mallory, Box 1951, Clarksburg, W. Va., *Supt. Meter Dept.*; C. M. Fleming, Box 1497, Charleston, W. Va., *Div. Supt.* 4,920 miles, 2- to 20-inch.

Houston Gulf Gas Co., Houston, Tex.
N. C. McGowen, Shreveport, La., *Pres.*; R. H. Hargrove, M. A. Abernathy, H. W. Streat, New York, N. Y., *V. P.s*; S. L. Davis, *Comptroller*; J. H. Miracle, *Sec.* and *Asst. Treas.*; A. L. McClellan, *Treas.* and *Asst. Sec.*; R. E. Hull, *Gen. Auditor*; George D. Fiser, *Asst. Sec.* and *Asst. Treas.*; A. D. Greene, *Ch. Engr.*; W. F. Fulton, *Ch. Chem.*; E. R. Cunningham, *Supt. of Transmission*; J. S. Ivy, *Supt. of Exploration*; A. L. Bradford, *Supt. of Compr. Sta.*; Ray Rountree, *Supt. of Measurement*; E. M. Smith, *Ch. Dispatcher*; C. A. McDowell, Beeville, Tex., W. H. Kearney, *Dist. Mgrs.* 487.50 miles, 1- to 18-inch.

Houston Pipe Line Co., Petroleum Bldg., Houston, Tex.
George A. Hill, Jr., *Pres.*; L. S. Zimmerman, *V. P.* and *Treas.*; A. H. Kennerly, *Sec.*; C. Lee Wood, *Gen. Mgr.*; W. E. Smith, Dinero, Tex., *Compressor Sta. Supt.*; Rex West, Box 991, Beeville, Tex., *Field Supt.*; H. D. Carmouche, *Dist. Supt.*; C. J. Brown, *Supt. of Measurements*; F. Y. Hutchison, Walter H. Coster, Woodsboro, Tex., G. P. Parker, Hebbronville, Tex., Clarence Robbins, Dinero, Tex., L. E. Wagstaff, Edna, Tex., *Ch. Engrs.*; H. J. Worth, Woodsboro, Tex., Jack Everman, Dinero, Tex., H. C. Shaw, Hebbronville, Tex., *Field Foremen*; Jack Collerain, *Supt. of Tel.* and *Tel.*; David Harrell, *Corrosion Engr.*; J. W. Mayo, *Inspector*; R. D. Parker, Floyd Curtsinger, Freeport, Tex., T. A. Chappell, Wharton, Tex., Charles Anderson, Edna, Tex., E. E. Trapp, Victoria, Tex., P. J. Manning, Taft, Tex., Eddie Rimmer, Bay City, Tex., *Dist. Foremen*; T. P. Ewing, *Ch. Dispatcher*; James L. Burke, *Lab.* and *Del. Sta. Inspector*; Robert L. Dabney, *Sales Mgr.* 624.74 miles, 6- to 18-inch.

I

Indiana Gas Distribution Corp., Zionsville, Ind.
C. I. Weaver, *Pres.*; T. H. Kerr, W. L McCloy, *V. P.s*; E. M. Tharp. *V. P.* and *Gen. Mgr.*; P. A. Alberty, *Sec.*; E. D. Bivens, *Treas.*; P. G. Miller, *Dist. Mgr.* 47.33 miles.

Indiana Southwestern Gas Corp., Vincennes, Ind.
R. D. Brown, *Pres.*; Albert E. Thompson, *V. P.*; D. L. Rinehart, *Sec.* and *Treas.*; R. E. Eckel, *Gen. Mgr.* 150 miles.

Inland Gas Corp., Ashland, Ky.
Ben Williamson, Jr., *Trustee*; O. H. Horne, *Gen. Supt.*; H. P. Stump, *Gas Meas. Supt.*; W. A. Horne, *Engr.*; R. D. Soper, *Pur. Agt.*; M. Staley, Prestonsburg, Ky., *Field Supt.*; V. O. Ward, Prestonsburg, Ky., *Sta. Supt.*; R. E. Moore, Hueysville, Ky., D. Reed, Lackey, Ky., C. Barnett, Ivel, Ky., *Div. Foremen* 306.83 miles, 2- to 16-inch.

Interstate Natural Gas Co., Inc., 30 Rockefellar Plaza, New York City, N. Y.
F. H. Lerch, Jr., *Pres.*; W. A. Dougherty, *V.P.*; E. E. DuVall, *Sec.*; James Comerford, *Treas.*; John Gordon, Monroe, La., *Gen. Supt.* 334.72 miles.

Iowa-Nebraska Light & Power Co., Lincoln, Neb.
L. R. King, *Pres.*; O. R. Mallatt, *Sec.*; William Fenton, *Treas.*; F. J. Gunther, *Asst. Gen. Mgr. Ch. Oper.*; R. L. Schacht, *Asst. Ch. Engr.*; E. E. Miller, *Gas Supt.*; Ed Henneh, *Gas Supt.* 50 miles.

J

James City Gas Co., Kane, Pa.
Wm. R. James, *Pres.*; M. C. James, *V. P.*; E. H. James, *Sec.* and *Treas.* 8 miles, 4-inch.

Jenks Natural Gas Co., Jenks, Okla.
Ed Blieden, *Trustee*; J. R. Johnston, *Mgr.*; W. J. Corgan, *Supt.* 15.7 miles, 1- to 6-inch.

Kentucky Natural Gas Corp., Owensboro, Ky.
J. H. Hillman, Jr., Pittsburgh, Pa., *Pres.*; W. J. Hinchey, *V. P.* and *Gen. Mgr.*; H. A. Sprowls, Vincennes, Inc., *Sec.*; Charles A. Meyer, Pittsburgh, Pa., *V. P.* and *Treas.*; W. T. Stevenson, *Asst. Sec.* and *Asst. Treas.*; H. F. Keith, *Pur. Agt.*; H. C. Nunn, *Supt. of Trans.*; H. H. Walker, *Supt. of Distr.*; Charles E. Curry, *Supt. of Compressors*; D. L. Benson, *Supt. of Meas.*; H. C. McKinley, *Supt. of Prod.*; W. J. Theis, Charlie Cook, L. B. Benson, R. L. Robards, *Dist. Supts.*

K

Kevin Gas Distribution Co., Kevin, Mont.
J. H. Agen, *Pres.*; F. H. McPhillips, *V. P.*; M. J. Roder, *Sec.* and *Treas.* 5½ miles, 2- and 4-inch.

L

Larner Gas Co., Charleston, W. Va.
Company now in receivership. W. A. Larner, *Pres.*, B. A. Wise and A. F. McCue, *Trustees*; J. M. Dolan, *Gen. Supt.*

Le Flore Co. Gas & Electric Co., Poteau, Okla.
Charles T. Orr, *Pres.* and *Gen. Mgr.*; Raymond F. Orr, *V. P.*; C. B. Saviers, *Sec.* and *Treas.*; James F. Orr, *Engr.*; H. A. Sickman, *Field Supt.*; George F. Allen, *Sta. Engr.* 85 miles, 6- and 8- inch.

Lone Star Gas Co., 1915 Wood St., Dallas, Tex.
L. B. Denning, *Pres.*; D. A. Hulcy, R. A. Crawford, E. F. Schmidt, *V. P.s*; D. L. Cobb, *Sec. and Treas.*; Julian L. Foster, *Gen. Supt.* and *Ch. Engr.*; B. L. Rogers, *Supt. Compr. Dept.*; O. H. Moore, *Asst. Supt.*

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Compr. Dept.; R. Vandercock, *Supt. Pipe Line Dept.*; Luther Tolbert, *Asst. Supt. Pipe Line Dept.*; D. A. Sillers, *Supt. Gas Meas. Dept.*; J. A. Martin, *Supt. Trans.* and *Maintenance*; B. R. Newbery, *Pur. Agt.*; Jas. T. Bickly, Box 498, Ballinger, Tex., Eldon Glenn, Rt. 5, Box 632, Waco, Tex., J. N. Carpenter, Box 567, Gainesville, Tex., Fred Smith, Box 253, Petrolia, Tex., W. G. Webb, Box 86, Gordon, Tex., Mark Black, Box 351, Duncan, Okla., Geo. Minton, Box 88, Joshua, Tex., L. E. DePew, Drawer 349, Shamrock, Tex., T. E. Waddill, Rt. 6. Box 268, Fort Worth, Tex., Aubrey Boyd, Rt. 1, Cayuga, Tex., W. F. Crook, Rt. 1, Abilene, Tex., Tod Pazdral, Box 478, Irving, Tex., E. K. Smith, Box 78, Ranger, Tex., Joe Martin, Box 1680, Vernon, Tex., J. I. Pearce, Box 348, Groesbeck, Tex., *Gen. Foremen*; Ralph Shipp, Petrolia, Tex., W. E. Johns, Box 398, Healdton, Okla., M. W. Crowder, Box 88, Joshua, Tex., C. W. Cardwell, Shamrock, Tex., S. M. Gamble, Box 78, Ranger, Tex., *Dist. Engrs. Compr. Dept.*; C. H. Porch, Box 107, Duncan, Okla., Dan Harris, Box 518, Albany, Tex., P. W. Swope, Baird, Tex., G. H. King, Box 488, Ranger, Tex., J. P. Haynie, Box 43, Eastland, Tex., J. T. Hubbard, Box 537, Rising Star, Tex., Edgar Huffman, Box 88, Caddo, Tex., L. H. Taylor, Box 185, Ranger, Tex., J. A. Norwood, Box 00, Ballinger, Tex., T. N. Jenkins, Breckenridge, Tex., J. F. Trott, Box 78, Ranger, Tex., F. L. McCurdy, Box 567, Gainesville, Tex., Edgar Sanderson, Rt. 2, Box 132, Eastland, Tex., *Ch. Engrs.* 4,111 miles, 2- to 24-inch.

M

Mars Co., The, 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.*; A. C. Burwell, *V. P.*; H. S. Rose, *Sec.* and *Treas.*; G. H. W. Sherman, *Asst. Sec.*; M. J. Talley, *Asst. Sec. and Treas.*; M. J. Connor, *Pur. Agt.*

Mercer County Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.*; W. H. Locke, *V. P.*; H. S. Rose, *Sec.* and *Treas.*; G. H. W. Sherman, *Asst. Sec.*, M. J. Talley, *Asst. Sec.* and *Asst. Treas.*; P. L. Mulkin, *Supt. of Distribution*; M. J. Connor, *Pur. Agt.*

Mississippi River Fuel Corp., Continental Bldg., St. Louis, Mo.

H. C. Cooper, *Pres.*; Ben C. Comfort, *V. P.* and *Mgr.*; F. H. Lerch, Jr., *V. P.* and *Treas.*; Reid L. Carr, *Sec.*; George M. Parker, *Asst. to V. P.* and *Mgr.*; Lawrence H. Simpson, *Asst. Treas.*; Arthur W. Commerville, *Asst. to V. P.* and *Mgr.*; Renard Z. Snyder, *Supt. Main Line* and *Sta.*; Harry E. Faith, *City Supt.*; Felix J. Martin, *Asst. City Supt.*; Howard G. Graham, *Engr.*; George C. Crose, *Rights of Way* and *Tax Agt.*; Karl A. Bosmyer, *Engr. in Chg. Gas Meas.*; Albert G. Hoge, Monroe, La., *Sta.* and *Main Line Engr.*; Allen W. Joiner, Poplar Bluff, Mo., *Supt. Comp. Sta.*; LeRoy M. Gibson, *Asst. Supt. Comp. Sta. in Chg. Cooper-powered Sta.*; Ray W. Bargar, Poplar Bluff, Mo., *Main Line Supt.*; John H. Young, Bastrop, La., T. C. McLellan, Star City, Ark., Robert E. Baum, West Point, Ark., Bert B. Bush, Biggers, Ark., Holly M. Gillespie, Zion, Mo., *Foremen Comp. Stas.*; Albert B. Willey, Crossett, Ark., James C. Lemon, Wilmar, Ark., Roe W. Hollis, Carlisle, Ark., James G. Reese, Newport, Ark., Jasper N. Hart., Poplar Bluff, Mo., Clarence R. Garrett, Zion, Mo., James A. Sullivan, Farmington, Mo., *Div. Foremen*; Clair B. McMahan, *Supt. Aerial Patrol and Trans.*

Monongahela West Penn Public Service Co., Fairmont, W. Va.

A. C. Spurr, *Pres.*; C. H. Leatham, J. K. Buchanan, *V. P.s*; O. F. Lough, *V. P.* and *Treas.*; G. J. Jackson, *Sec.*; G. W. Harr, *Mgr. Gas Dept.*; G. H. Jackson, H. E. Wilson, Morgantown, W. Va., *Field Supts.*; J. R. Henderson, J. W. Allison, Morgantown, W. Va.; *Distribution Supts.*; K. H. Bane, *Supt. Compr. Sta.*; T. K. Heck, *Supt. of Meters.* 443.64 miles, 2- to 10-inch.

Montana-Dakota Utilities Co., 831 Second Ave., South, Minneapolis, Minn.

C. C. Yawkey, Wausau, Wis., *Pres.*; R. M. Heskett, *V. P.* and *Treas.*; Ben Alexander, Conway Bldg., Chicago, Ill., *V. P.*; A. P. Woodson, Wausau, Wis., *Sec.*; Cecil W. Smith, *Ch. Engr.*; H. M. Frederickson, *Gas Engr.*; A. F. Anderson, *Pur. Agt.*; James Trimble, Bismack, N. Dak., C. B. Aasness, Rapid City, S. Dak., E. W. Browne, Sheridan, Wyo., Robert Naylor, Miles City, Mont., Noel Carrico, Glendive, Mont., James Phillips, Glasgow, Mont., F. S. Marion, Havre, Mont., Harlan Scott, Great Falls, Mont., V. M. Cleaveland, Williston, N. Dak., *Div. Mgrs.*; H. A. Schroth, Baker, Mont., Clyde Keys, Shelby, Mont., *Gas Field Supts.* 1,084.8 miles, 2- to 12-inch.

Mountain Fuel Supply Co. (Utah), 539 S. Main St., Findlay, Ohio

T. B. Gregory, 800 Union Trust Bldg., Pittsburgh, Pa., *Chm. of Bd.* and *Treas.*; O. D. Donnell, *Pres.*; L. B. Denning, 1915 Wood St., Dallas, Tex., J. M. Simpson, 800 Union Trust Bldg., Pittsburgh, Pa., J. C. Donnell, II, R. M. Redding, 301 S. Harwood, Dallas, Tex., J. D. Roberts, 36 S. State St., Salt Lake City, Utah, C. L. Fleming, John McFadyen, Wolcott and A Sts., Casper, Wyo., C. R. Hetzler, Rock Springs, Wyo., *V. P.s*; F. B. Firmin, *Sec.* and *Asst. Treas.* 441.51 miles, 3- to 18-inch.

Mountain State Gas Co., Chicago, Ill.

D. D. Irwin, *Pres.*; Henry Hauseman, *V. P.*; C. H. Jay, *Sec.* and *Treas.*; J. H. Botkin, *Comptroller*; J. A. Waggoner, Dawes, W. Va., *Gen. Mgr.*; O. M. Lovell, Cabin Creek, W. Va., *Supt.* 37 miles, 2- to 6-inch.

N

Natural Gas Pipe Line Co. of America, Chicago, Ill.

W A. Jones, *Pres.*; Floyd C. Brown, *V. P.* and *Gen. Mgr.*; W. A. Daugherty, R. Ogarrio, *V. P.s*; S. E. Campbell, *Sec.*; E. H. Johnston, *Treas.*; E. V. Kesinger, *Gen. Supt.*; G. M. Davidson, *Ch. Engr.* and *Supt. of Oper.*; R. G. Strong, *Pipe Line Supt.*; W. H. Davidson, *Supt. of Compr. Sta.*; W. T. Bula, *Supt. of Tel.* and *Pressure*; M. C. Madsen, *Supt. of Constr.*; Earl Rush, Joliet, Ill., *Meter Supt.*; D. C. Palm, Geneseo, Ill., L. S. Duddleston, Truro, Ia., M. J. Cook, Beatrice, Nebr., M. V. Burlingame, Heizer, Kans., *Pipe Line Dist. Supts.*; E. D. Warren, Harper, Ia., H. E. Smith, Heizer, Kans., *Pipe Line Div. Supts.*; W. E. Warner, Sta. No. 2, Gray, Okla., J. M. Daugherty, Sta. No. 3, Bloom, Kans., C. C. Jolley, Sta. No. 4, Heizer, Kans., H. C. Taintor, Sta. No. 5, Glasco, Kans., E. C. Marsh, Sta. No. 6, Beatrice, Nebr., D. B. Sprow, Sta. No. 8, Hastings, Ia., F. F. Graham, Sta. No. 8, Truro, Ia., H. R. Rohwedder, Sta. No. 9, Harper, Ia., R. M. Hendry, Sta. No. 10, Geneseo, Ill., *Supts.* 841.4 miles, 2- to 24-inch.

New Mexico Eastern Gas Co.* Dallas, Tex.

Albert S. Johnson, *Pres.*; F. W. Smith, J. R. Cole, *V. P.s*; C. H. Zachry, *V. P.* and *Treas.*; H. V. McConkey, *Sec.*; J. C. Reid, *Gen. Supt.*; Van Thompson, *Supt. Measurement*; F. D. Bradley, *Pur. Agt.*; E. M. Kelley, Clovis, N. Mex., *Dist. Mgr.*; J. R. Cole, Santa Fe, N. Mex., *Oper. Mgr.*; J. H. Wilson, Santa Fe, N. Mex., Newland Oldham, Carlsbad, N. Mex., *Div. Mgrs.*; J. D. Jackson, Portales, N. Mex., Horace Echols, Tucumcari, N. Mex., Ed Reddy, Carlsbad, N. Mex., Chas. Gaskins, Artesia, N. Mex., Clint Cole, Lovington, N. Mex., Herman Cole, Clovis, N. Mex., *Local Mgrs.* 371 miles, 8⅝-inch down. *New Mexico Eastern Gas Co. was formed by the consolidation of The Gas Co. of New Mexico, Consumers Natural Gas, Pecos Valley Gas Co. and Lovington Gas, Water & Sewer Co.

New Mexico Gas Co., Santa Fe, N. Mex.

Albert S. Johnson, *Pres.*; J. R. Cole, *V. P.* and *Oper. Mgr.*; Ross Byron, *V. P.*; H. C. Zachry, *V. P.* and

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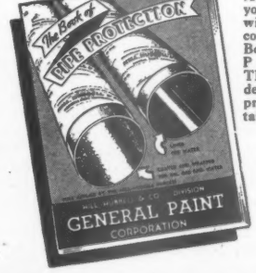

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New York State Natural Gas Corp., 545 William Penn Way, Pittsburgh, Pa.

J. French Robinson, *Pres.;* T. R. Weymouth, J. C. Trees, *V. P.s;* E. E. Duvall, *Sec.;* F. H. Lerch, Jr., *V. P.* and *Treas.* 236.96 miles, 2- to 20-inch.

North East Heat & Light Co., 16 N. Lake St., North East, Pa.

Stephen T. Lockwood, *Pres.;* C. O. Zimmermann, *Sec.;* Robert I. Thompson, *Treas.* and *Supervising Mgr.;* John G. Watt, *Local Supt.* 19.3 miles, 1- to 8-inch.

Northern Natural Gas Co., 310 Aquila Court Bldg., Omaha, Neb.

F. H. Brooks, *Pres.;* Burt R. Bay, *V. P.* and *Gen. Mgr.;* L. B. Denning, J. D. Mortimer, *V. P.s;* D. A. Hulcy, *Sec.;* H. E. Johnson, *Treas.;* R. L. Harrison, *Supt. Distribution;* J. L. Griffin, *Measurement Engr.;* C. F. Martin, *Pur. Agt.;* H. J. Carson, *Ch. Engr.* and *Supt. of Oper.;* K. N. Fancher, *Asst. Ch. Engr.;* J. O. Haught, Clifton, Kans.; P. F. Kittell, Joe Morriss, *Constr. Foremen;* S. W. Taft, *Supt. of Trans.;* J. P. Bristow, *Asst. Supt. of Trans.;* H. W. Shubring, *Asst. Supt. Trans., Compr. Dept.;* J. H. Goughnour, Mullinville, Kans.; *Master Mech.* and *Sta. Supt.;* John Riffee, Clifton, Kans., *Master Mech.* and *Sta. Supt.;* W. A. Waldrop, Clifton, Kans., *Asst. Sta. Supt.;* V. W. Roberts, Otis, Kans., *Sta. Supt. Dehydration-Desulfurization Plant;* J. B. Stewart, Skellytown, Tex., A. L Chambers, Bushton, Kans., H. D. Rice, Beatrice, Nebr., R. M. Hawkins, Palmyra, Nebr., A. L. Vaughan, Oakland, Ia., W. A. Skinner, Ogden, Ia., T. F. Teel, Ventura, Ia., *Sta. Supts.;* W. O. Propst, Skellytown, Tex., A. L. During, Meade, Kans., Steve Marshall, Bushton, Kans., M. H. Garrett, Lincoln, Nebr., P. T. McDonough, So. Sioux City, Nebr., D. J. Wallace, Ogden, Ia., P. A. Gass, Owatonna, Minn., *Div. Supts.;* Clifford Beck, Perryton, Tex., John McIntyre, Ashland, Kans., R. V. Boyd, Mullinville, Kans., C. A. Fronk, Meade, Kans., I. G. Bailey, Otis, Kans., R. V. Glenn, Clifton, Kans., V. D. Phillips, Beatrice, Nebr., Earl Carr, Lincoln, Nebr., Jack Waters, Omaha, Nebr., J. F. Reid, Oakland, Nebr., H. A. Shearon, So. Sioux City, Nebr., W. B. Haas, Sioux Falls, S. Dak., S. B. Willhite, Oakland, Ia., Charles Tonesfeldt, Ogden, Ia., J. C. Redmond, Ventura, Ia., Del Ledlum, Owatonna, Minn., C. L. McDermond, Rosemount, Minn., *Dist. Foremen.* 2,451 miles, 2- to 26-inch.

Northern Oklahoma Gas Co., Ponca City, Okla.

D. C. Williams, *Pres.;* J. A. Shoemaker, *V. P.;* Samuel S. Sherman, Jr., *Sec.;* William H. Hill, *Treas.;* J. E. Shobe, *Supt.*

Northwestern Natural Gas Corp., 1248 First Ave., South, Seattle, Wash.

R. B. Newhern, *Pres.;* Dr. George L. Gropp, *V. P.;* Louis Hoefle, *Sec.* and *Treas.;* S. A. McCune, Toppenish, Wash., *Mgr.;* J. H. Mann, Benton City, Wash., *Field Supt.;* C. W. Sears, Pasadena, Cal., *Trustee.* 110 miles, 2- to 10-inch.

Northwestern New York Gas Co., 518 Jackson Bldg., Buffalo, N. Y.

Merged with Republic Light, Heat & Power Co., Inc.

Northwestern Ohio Natural Gas Co., The, 99 N. Front St., Columbus, Ohio

C. I. Weaver, *Pres.;* E. M. Tharp, *V.P.* and *Gen. Mgr.;* T. H. Kerr, *V.P.;* P. A. Alberty, *Sec.;* E. D. Bivens, *Treas.;* I. A. Ludwig, *Dist. Mgr.;* C. C. Johnson, *Dist. Plant Supt.;* W. L. McDonald, *Dist. Ser. Mgr.;* R. J. Miller, *Dist. Appliance Sales Mgr.;* R. S. Wenner, *Dist. Industrial Sales Mgr.;* C. A. Berndt, *Gen. Foreman;* Herbert Bach, Oscar Bruckner, R. K. Delano, H. C. DeWese, James Fike, P. J. McDonough, Fred O'Leary, J. F. Ross, *Foremen;* Roydon Van Meter, *Ch. Inspector.*

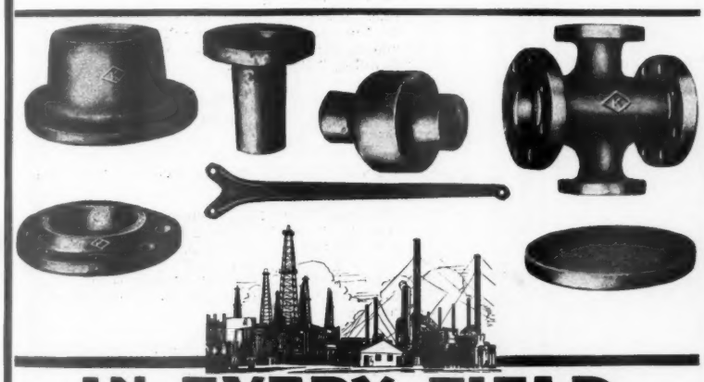
Northwestern Utilities, Ltd., Edmonton, Alberta, Canada

H. R. Milner, *Pres.;* E. W. Bownes, *V. P.;* J. B. Whelihan, *Sec.* and *Treas.;* Julian Garrett, *Gen. Mgr.;* G. W. Green, *Gen. Supt.;* E. F. McGarvey, *Business Mgr.;* E. Nelson, *Ch. Engr.;* C. E. Wiggins, *Mgr. Commercial Dept.;* A. J. Danes, *City Supt.;* F. G. Imler, *Main Line Supt.;* H. R. Brooke, *Field Supt.;* Miss Nova McCulloch, *Home Service Director.* 311 miles.

O

Ohio Fuel Gas Co., 99 N. Front St., Columbus, Ohio

C. I. Weaver, *Pres.,* E. M. Tharp, *V. P.* and *Gen. Mgr.;* R. H. Delafield, T. H. Kerr, W. L. McCloy, *V. P.s;* P. A. Alberty, *Sec.;* E. D. Bivens, *Treas.;* D. B. Walker, 1000 Brentnell Ave., Columbus, O., C. L. Leibengood, Galion, O.; S. I. Parcell, Wooster, O., W. C. Gundelfinger, Athens, O., *Div. Supts. Pipe Line Dept.;* G. J. Baxter, Pavonia, O., R. D. Weaver, Box 325, Athens, O., L. D. Myers, Homer, O., *Div. Supts. Compr. Dept.;* E. N. Corwin, Athens, O., E. B. Konkler, Wooster, O., E. W. Emery, *Div. Supts. Meas. Dept.;* F. A. Jones, Mt. Vernon, O., J. H.



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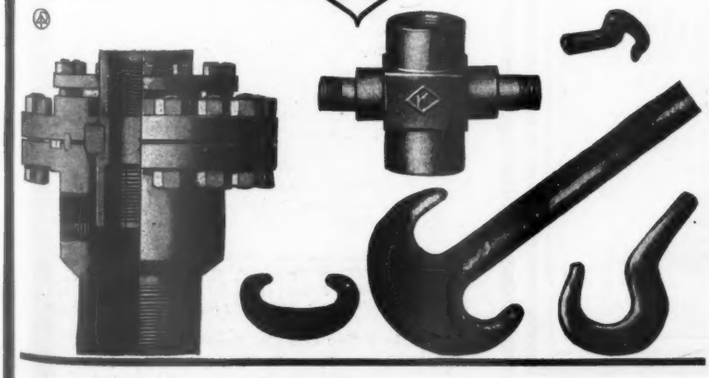

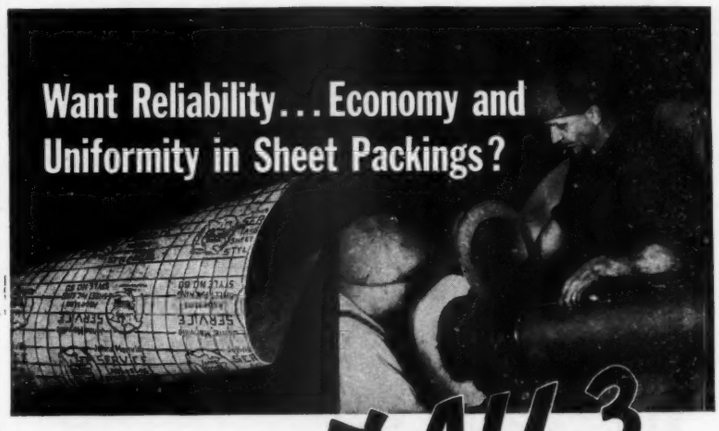

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Oklahoma Natural Gas Co., Box 871, Tulsa, Okla.

Jos. Bowes, *Pres.;* C. U. Daniels, Frank B. Long, Judge R. C. Allen, George Frederickson, Paul R. Taylor, *V. P.s;* Fred W. Peters, *Sec.* and *Treas.;* W. M. Maher, Bin J, Okmulgee, Okla.; P. V. Root, Box 1617, Muskogee, Okla., W. W. Bruce, Box 178, Chandler, Okla., Geo. W. Brinkley, Box 969, Ardmore, Okla., J. A. Ray, Box 907, Enid, Okla., Thos. H. Sterling, Box 987, Oklahoma City, Okla., F. E. Padden, Box 3091, Shawnee, Okla., *Dist. Mgrs.;* E. H. Newkirk, Bin J, Okmulgee, Okla., W. G. Van Arsdale, Box 1617, Muskogee, Okla., Jack Gillis, Box 969, Ardmore, Okla., C. R. Shiers, Box 907, Enid, Okla., T. A. Wood, Box 987, Oklahoma City, Okla., Lee Prokop, Box 3091, Shawnee, Okla., W. A. Hazard, *Dist. Supts.;* J. E. Mineo, *City Plant Supt.;* C. M. Van Slyke, Box 408, Iola, Kans., *Supt. Kans. Properties;* L. A. Farmer, *Gen. Supt.;* Gilbert Estill, *Supt. Gas. Meas.;* R. W. Ducker, *Ch. Engr.* 4,162 miles, 2- to 16-inch.

Oklahoma Power & Water Co., Sand Springs, Okla.

R. W. McClure, *Pres.;* T. E. Mansfield, *V. P.;* T. S. Matthews, *Sec.;* C. F. Colvin, *Treas.;* H. H. Young, *Gas Supt.* 190.6 miles.

Ottumwa Gas Co., Ottumwa, Iowa

George G. Holmes, *V. P.;* Arthur Seaburg, *Treas.;* C. A. Davis, *Supt.* 23 miles, 3-inch.

P

Pacific Gas & Electric Co., 245 Market St., San Francisco, Calif.

J. B. Black, *Pres.;* P. M. Downing, J. P. Coghlan, A. E. Wishon, A. H. Markwart, W. G. Vincent, R. E. Fisher, *V. P.s;* D. H. Foote, *V. P., Sec.* and *Treas.;* R. S. Fuller, *Engr. in Chg. Gas Constr.* and *Oper.;* F. F. Doyle, *Mgr. Nat. Gas Div.;* Harry J. Smith, *Constr. Engr.* 8,032 miles, 2- to 26-inch.

Panhandle Eastern Pipe Line Co., 101 W. Eleventh St., Kansas City, Mo.

J. D. Greveling, *Pres.;* G. J. Neuner, *V. P. Ch. Oper.;* Leith V. Watkins, *Sec.* and *Controller;* Louis F. Sperry, *Treas.;* N. F. Paxton, *Asst. Sec.* and *Asst. Treas.;* J. F. Curry, *Supt. of Distribution Dept.;* J. C. Reinbold, *Gen. Supt.;* G. T. Kotch, *Supt. of Compressors;* J. D. Freeman, *Supt. of Prod.;* H. W. Pope, *Supt. Land Dept.;* D. K. Stephens, *Supt. Pipe Line Dept.;* J. S. Stevenson, *Supt. Engr. Dept.;* Fay C. Walters, *Supt. of Measurement Dept.;* S. A. Taylor, Kansas City, *Pur. Agt.;* James L. Murphy, Liberal, Kans., John C. Wright, Paola, Kans., Charley O. McCoy, Boonville, Mo., William K. Sanders, Glenarm, Ill., Russell W. Plank, Liberal, Kans., Richard D. Ricketts, Louisburg, Kans., *Div. Supts.;* Arthur A. Deam, Stinnett, Tex., Ernest R. Thomas, Greensburg, Kans., Theodore R. Drayer, Haven, Kans., Oscar W. Price, Olpe, Kans., Sam J. Dunlap, Louisburg, Kans., Oscar A. Milliken, Houstonia, Mo., Armand Andris, Centralia, Mo., Francis A. Jackson, Pleasant Hill, Ill., Thomas E. Gilliam, Glenarm, Ill., John C. Porter, Tuscola, Ill., *Ch. Engrs.;* Lex W. Phillips, Stinnett, Tex., Samuel H. Neithercoat, Hugoton, Kans., *Prod. Engrs.;* J. T. Russell, Liberal, Kans., *Ch. Chem.;* Clarence R. Williams, Liberal, Kans., *Gasoline Plant Engr.*

Panhandle Pipe Line Co., P. O. Box 637, Amarillo, Tex.

R. E. Wertz, *Pres.;* M. D. Snyder, F. E. Jones, Kansas City, Mo., E. A. Sickels, Tulsa, Okla., *V. P.s;* George Baird, New York, N. Y., *Sec.* and *Treas.;* E. C. Wagner, *Gen. Supt.;* R. L. Dever, *Supt.* 33.1 miles.

Peoples Gas & Fuel Co., Inc., 901 Slattery Bldg., Shreveport, La.

Charles G. Laskey, *Pres.;* George Belchic, *V. P.;* F. J. Gaumer, *Asst. Sec.* and *Asst. Treas.;* M. C. Bubenzer, *Ch. Engr.;* R. H. Curry, Haynesville, La., *Gen. Mgr.;* G. S. Jones, Haynesville, La., *Supt.* 123 miles, 2- to 6-inch.

Peoples Natural Gas Co., The, 545 William Penn Way, Pittsburgh, Pa.

J. French Robinson, *Pres.;* S. C. Preston, *V. P.;* S. E. W. Burnside, *Sec.;* S. J. Ratcliffe, *Treas.;* E. W. Williamson, *Mgr.;* L. E. Ostrye, *Supt. City Plants.* 553.145 miles, 2- to 30-inch.

Phillips Gas & Oil Co., T. W., 205 N. Main St., Butler, Pa.

T. W. Phillips, Jr., *Pres.;* B. D. Phillips, *V. P.* 2.203 miles.

Pittsburgh & West Virginia Gas Co., 435 Sixth Ave., Pittsburgh, Pa.

F. R. Phillips, *Pres.;* F. F. Schauer, *V. P.;* Joseph McKinley, *V. P. in Chg. Sales;* C. S. Mitchell, *Controller;* W. B. Carson, *Sec.;* C. J. Braun, Jr., *Treas.,* D. P. Hartson, *Oper. Mgr.;* H. H. Pigott, *Gen. Supt. Prod.* and *Trans.;* J. Bonsall, Union Bank Bldg., Clarksburg, W. Va., *Supt. Compr. Sta.* 1,371.87 miles, 1- to 20-inch.

Public Service Co. of Oklahoma, Public Service Bldg., Tulsa, Okla.

Fred W. Insull, *Pres;* R. K. Lane, J. A. Whitlow, C. N. Robinson, *V. P.s;* R. F. Frank, *Sec.;* E. E. Ehret, *Treas.;* M. M. Schene, McAlester, Okla., *Dist. Mgr.;* C. J. Goodspeed, McAlester, Okla., *Supt. Gas Dept.;* John Lowerison, McAlester, Okla., *Engr.;* Jess Clanton, McAlester, Okla., *Foreman;* J. F. Dominie, McAlester, Okla., *Asst. Supt. Gas Dept.* 125.02 miles, ¾- to 10-inch.

Public Service Corp. of Texas, 810 Mid-Continent Bldg., Fort Worth, Tex.

Wm. Horwitz, *Pres.;* S. B. Horwitz, Thos. Cook, *V.P.s;* I. E. Horwitz, *Sec.;* M. A. Berman, *Treas.;* H. J. Boisdorf, Perryton, Tex., *Supt.;* Ivan Conklin, Canadian, Tex., George Clennan, Perryton, Tex., O. W. Elliott, Mobeetie, Tex., Cecil Henson, Shattuck, Okla., *Branch Mgrs.* 250 miles, 4- to 6-inch.

R

Reidsburg Natural Gas Co., Clarion, Pa.

C. E. Deitz, *Pres.;* E. E. Deitz, *Sec.* and *Treas.* 2 miles, 2-inch.

Republic Light, Heat & Power Co., Inc., 518 Jackson Bldg., Buffalo, N. Y.

T. W. Tutwiler, *Pres.;* S. B. Severson, *V. P.;* J. A. Richie, *Sec.* and *Treas.;* W. M. Hott, *Meter Engr.;* G. M. Merrill, *Gas Engr.;* J. F. Sweeny, W. B. Kopfer, P. H. Dole, A. H. Merritt, *Div. Supts.;* C. W. Taylor, Allie J. Smith, George Mix, Harold Cory, George Hamilton, C. L. Tyrell, E. F. James, Joe Tadt, Harry Utegg, E. H. Seeley, *Foremen.* 361.220 miles, 2- to 8-inch.

Revere Natural Gas Co., Jefferson, Pa.

C. R. Sellers, *Pres.;* J. R. Scott, *V. P.;* Harry A. Cree, *Sec.* and *Treas.*

Ridgway Natural Gas Co., 308 Seneca St., Oil City, Pa.

Geo. E. Welker, *Pres.;* W. H. Locke, *V. P.;* H. S. Rose, *Sec.* and *Treas.;* G. H. W. Sherman, *Asst. Sec.;* P. L. Mulkin, *Supt. of Distr.;* M. J. Connor, *Pur. Agt.*

Rio Grande Valley Gas Co., Brownsville, Tex.

B. E. Hepler, *Pres.;* R. B. Lloyd, Joseph C. Jordan, *V. P.s;* James T. Jackson, *Sec.* and *Treas.;* W. H. Meredith, *Asst. Sec.* and *Asst. Treas.;* R. T. McMinn,

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River Gas Co., The, 545 William Penn Way, Pittsburgh, Pa.

Howell C. Cooper, *Pres.;* L. L. Tonkin, *V. P.* and *Ch. Engr.;* J. C. Chisler, *V. P.* and *Treas.;* S. E. W. Burnside, *Sec.;* W. B. Gribble, Box 1951, Clarksburg, W. Va., *Gen. Supt.;* John W. Dow, Box 268, Marietta, O., *Local Agt.* 248 miles, 2- to 12-inch.

River Valley Gas Co., Paris, Ky.

J. Gates Williams, *Pres.;* P. C. Thompson, *Sec.* and *Treas;* Wyley Elliott, *Asst. Sec.;* O. R. Dill, Reid Glover, *Supts. Outside Maintenance.* 40 miles, 2- to 6-inch.

Rocky Mountain Gas Co., The, Casper, Wyo.

John McFadyen, *Pres.;* W. B. Emery, *V. P.;* J. A Lee, *Sec.* and *Treas.;* H. O. Kapp, Rawlins, Wyo., R. M. Miller, Cody, Wyo., G. F. Poe, Lovell, Wyo., *Dist. Supts.* 295.57 miles, 1- to 10-inch.

Russelton-Curtisville Gas Utilities, 542 N. Elm St., Butler, Pa.

Allison L. Heile, *Pres.;* Elmer E. Rieger, *Sec.* and *Treas.* 5½ miles, 2-inch.

S

San Joaquin Valley Pipe Line System, Box 1101, Coalinga, Calif.

A. S. Jones, *Supt.;* G. E. Herrmann, *Asst. Supt.;* D L. Hines, *Ch. Engr.;* W. W. Mitchell, *Asst. to Ch Engr.;* L. Post, *Supervisor of Gathering Systems* G. W. Knowles, *Div. Supt. of Oper.*

Santa Maria Gas Co., 203 W. Main St., Santa Maria, Calif.

R. E. Easton, *Pres.* and *Treas.;* F. S. Wade, *First V. P.;* R. W. Miller, *Second V. P.;* L. P. Scaroni, *Sec.;* A. T. Fesler, *Gen. Supt.* and *Asst. Gen. Mgr.;* R. B. Bruce, *Asst. Gen. Supt.* and *Gas. Engr.;* I. S. Keyser, *Mgr. Utilization Dept.;* Edward Marquart, Lompoc, Calif., P. Hawkins, Pismo Beach, Calif., C. W. Charles, San Luis Obispo, Calif., P. M. Graham, Paso Robles, Calif., *Local Mgrs.* 342.82 miles, 2- to 8-inch.

Sergeant Gas Co., Williamsport, Pa.

Eben Russ, *Pres.;* H. C. Bubb, *V. P.;* W. L. Heim, *V. P., Sec.* and *Treas.;* N. B. Bubb, Jr., *Asst. Sec.* and *Treas.;* J. H. Heim, *Supt.* 26½ miles, 1- to 8-inch.

Smethport Natural Gas Co., 308 Seneca St., Oil City, Pa.

Geo. E. Welker, *Pres.;* W. H. Locke, *V. P.;* H. S. Rose, *Sec.* and *Treas.;* G. H. W. Sherman, *Asst. Sec.;* P. L. Mulkin, *Supt. of Distribution;* M. J. Connor, *Pur. Agt.*

Southern California Gas Co., 810 S. Flower St., Los Angeles, Calif.

A. B. Macbeth, *Pres.;* H. L. Masser, LeRoy Edwards, T. J. Reynolds, William Moeller, Jr., W. E. Houghton, F. M. Banks, *V. P.s;* C. L. Mitchell, *Sec.;* L. D. Romig, *Treas.;* H. P. George, *Gen. Supt. Nat. Gas Prodn.* and *Trans.;* Lee Holtz, *Gen. Supt. Distribution;* J. G. Rollow, *Supervising Engr.;* B. M. Laulhere, *Tech. Supervisor;* R. M. Bauer, *Gas Supply Supervisor;* B. G. Williams, *Meas. Engr.;* Guy Corfield, *Research Engr.;* G. A. Porter, San Joaquin Valley Div., J. A. Farmer, Avenal Div., A. B. Newby, Kern Div., S. S. Donaldson, Newhall Div., S. C. Singer, Northern Div., J. E. Murray, Southern Div., H. C. McAllister, Eastern Div., *Mgrs.;* William Henderson, *Supt. Central Div.* (Distribution); E. Henderson, *Supt. Suburban Div.* (Distribution); C. W. Beck, *Gen. Foreman, Mfgr., Comp.* and *Storage;* E. L. Keasling, *Ch. Gas Dispatcher.* 8,910.4 miles, 2- to 36-inch.

Southern California Gas Co., 810 S. Flower St., Los Angeles, Calif.

A. B. Macbeth, *Pres.;* T. J. Reynolds, *V. P.* and *Gen. Counsel;* Wm. Moeller, Jr., *V. P. in Chg. Nat. Gas Prodn.* and *Trans.;* C. L. Whitehill, *Sec.,* L. D. Romig, *Treas.;* H. P. George, *Gen. Supt. Nat. Gas Prodn.* and *Trans.;* A. B. Newby, Box T, Taft, Calif., S. S. Donaldson, Box 303, Newhall, Calif., J. W. Farner, Avenal, Calif., H. C. McAllister, 570 Fourth St., San Bernardino, Calif., J. F. Murray, 515 E. Main St., Compton, Calif., *Div. Mgrs.;* Grove Lawrence, Taft, Calif., *Supt. Trans.* and *Prod.;* M. J. Binckley, Box T, Taft, Calif., W. K. Dodd, Box 850, Ventura, Calif., R. J. Bullard, Avenal, Calif., *Div. Engrs.;* J. S. Edwards, 570 Fourth St., San Bernardino, Calif., R. E. Haun, 515 E. Main St., Compton, Calif., *Div. Supts.* 963.4524 miles, 2- to 26-inch.

Southern Fuel Co., 810 S. Flower St., Los Angeles, Calif.

A. B. Macbeth, *Pres.;* F. B. Lewis, F. S. Wade, *V. P.s;* D. M. Trott, *Sec.* and *Treas.;* H. P. George, *Oper. Mgr.,* W. M. Pipkin, 845 W. Doran St., Glendale, Calif., *Supt.;* A. C. Johnston, *Auditor;* Malcolm R. Miller, Avenal, Calif., *Field Agt.;* S. A. Walsh, Glendale, Calif., *Ch. Dispatcher;* M. L. Paull, Glendale, Calif., *Foreman.*

Southern Natural Gas Co., Birmingham, Ala.

C. T. Chenery, 90 Broad St., New York City, *Chm. Bd.;* C. P. Rather, *Pres.;* H. G. Calder, *V. P.* and *Treas.;* W. R. Gignilliat, *V. P.* and *Sec.;* H. D. McHenry, New York City, *V. P.* and *Asst. Sec.;* H. E. Jackson, *Compt.;* R. H. Ulrich, *Gen. Supt.;* J. B. Milmoe, *Mgr. Sales* and *Service;* John M. Starke, *Mgr. Land* and *Lease;* R. H. Burdick, *Ch. Engr.;* J. P. Neill, *Supt. Pipe Lines;* J. W. Yeidell, *Supt. Compr. Sta.;* C. E. Terrell, *Supt. Measurement;* J. D. Kennedy, *Pur. Agt.*

Southern Ontario Gas Co., Ltd., 518 Jackson Bldg., Buffalo, N. Y.

Henry L. Doherty, *Pres.;* S. B. Severson, H. D. Hancock, New York, N. Y., *V. P.s;* J. A. Richie, *Sec.* and *Treas.;* W. M. Hott, *Meter Engr.;* G. M. Merrill, *Gas Engr.;* J. E. Whitaker, Brantford, Ont., *Asst. Meter Engr.;* F. D. Howell, Brantford, Ont., W. J. Marriott, Leamington, Ont., L. D. Burdick, St. Thomas, Ont., *Div. Supts.;* Wm. Flum, Dutton, Ont., Ira Gray, Merlin, Ont., Peter DiMaggio, Brantford, Ont., *Foremen.* 273.130 miles, 2- to 12-inch.

Southern Union Gas Co. (Delaware), Dallas, Tex.

Albert S. Johnson, *Pres.;* F. W. Smith, Ross Byron, *V. P.s;* C. H. Zachry, *V. P.* and *Treas.;* H. V. McConkey, *Sec.;* James C. Reid, *Gen. Supt.;* V. Thompson, *Supt. Measurement;* E. H. Newman, *Engr. Dept.;* F. D. Bradley, *Pur. Agt.*

Southern Union Production Co., Dallas, Tex.

Albert S. Johnson, *Pres.;* James C. Reid, *V. P.;* C. H. Zachry, *V. P.* and *Treas.;* H. V. McConkey, *Sec.;* F. D. Bradley, *Pur. Agt.*

Southern Union Utilities Co.,* Burt Bldg., Dallas, Tex.

Albert S. Johnson, *Pres.;* F. W. Smith, James C. Reid, *V. P.s;* C. H. Zachry, *V. P.* and *Treas.;* H. V. McConkey, *Sec.;* H. C. Frizzell, Dellville, Tex., A. C. Black, Kingfisher, Okla., Harry Beauchamp, Pecos, Tex., *Dist. Mgrs.;* J. E. Couzzen, Bellville, Tex., *Dist. Engr.;* N. P. Chestnut, Pyote, Tex., *Measurement;* W. M. Paulson, Columbus, Tex., J. A. Ruggles, Eagle Lake, Tex., H. D. Schwarz, Hempstead, Tex., W. M. Marcum, Hico, Tex., W. H. Koehn, Navasota, Tex., G. D. Webb, McCamey, Tex., H. Doty, Monahans, Tex., R. E. Horne, Wink, Tex., *Local Mgrs.* *Southern Union Utilities Co. is successor by consolidation of Southern Union Gas Co. of Texas, Kingfisher County Gas Co., Cities Water Co., M. & M. Pipe Line Co. and Wink Gas Co.

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Many thousand miles of pipeline more economically and efficiently located, laid, and operated testify to the performance of Tobin Aerial Photographic Mapping as cost-saving equipment on pipeline construction projects.

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GOTT WATER CAN
Made in 1½, 3, 5, and 10 gallon sizes.

Gotkool

WATER CANS & COOLERS

GOTT Water Cans are the practical way to keep drinking water cool for long periods, protected from impurities and always handy to the job. Snug fitting large removable top, strongly built to withstand rough usage. GOTT Water Coolers have extra large covers and a handy non-leaking push button faucet. Your Supply Store has them, get one today!

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H. P. GOTT MFG. CO.
WINFIELD, KANSAS

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A New Drill by STAR ★

The No. 75 <SPUDRILL>

★ Shockless Spudder that Gives Controlled Drilling Action
Faster Drilling
Complete Protection to Machine
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Insurance Against Fishing Jobs
★ Steel Arc Welded Construction Throughout
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★ . . . and a Host of Other Features.

The many advanced features of this new Star drill will be a revelation to you. Here in one machine are ALL the features that drillers have long wanted in a portable drilling machine. Whether you are in the market now or not — you will want to know about the No. 75 Star Spudrill.

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STAR DRILLING MACHINES

★ *For All Around Satisfactory Performance* ★

Southwest Natural Gas Co., 901 Slattery Bldg., Shreveport, La.

Charles G. Laskey, *Pres.;* George Belchic, *V.P.;* F. J. Gaumer, *Asst. Sec.* and *Asst. Treas.;* M. C. Bubenzer, *Ch. Engr.;* W. O. Smith, Ada, Okla., *Supt.;* C. A. Breitung, Ada, Okla., H. F. Adlam, Lockhart, Tex., *Gen. Mgrs.;* C. E. Still, Stephenville, Tex., *Dist. Mgr.* 298 miles, 1- to 16-inch.

Southwestern Light & Power Co., Box 1470, Tulsa, Okla.

Fred W. Insull, *Pres.;* R. K. Lane, *V. P.;* A. M. McKinney, *Sec.;* C. W. McIlhenny, *Treas.;* Wm. Schumacher, Lawton, Okla., *Mech. Engr.;* E. W. Shull, Lawton, Okla., J. T. Thompson, Chickasha, Okla., *Gas Supts.* 38.42 miles, 4- to 8-inch.

St. Marys Natural Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.;* W. H. Locke, *V. P.;* H. S Rose, *Sec.* and *Treas.;* M. J. Talley, *Asst. Sec.* and *Asst. Treas.;* P. L. Mulkin, *Supt. of Distribution;* A. C. Burwell, *Supt. of Sta.;* M. J. Connor, *Pur. Agt.*

State Line Gas Co., Fairmont, W. Va.

A. C. Spurr, *Pres.;* C. H. Leatham, J. K. Buchanan, *V. P.s;* O. F. Lough, *V. P.* and *Treas.;* G. J. Jackson, *Sec.;* G. W. Harr, *Mgr.;* H. E. Wilson, Morgantown, W. Va., *Field Supt.;* J. W. Allison, Morgantown, W. Va., *Distribution Supt.* 32.21 miles, 2- to 8-inch.

State Fuel Supply Co., 1320 Petroleum Bldg., Oklahoma City, Okla.

R. B. Crawford, *Pres.;* F. S. Pratt, M. T. Drisko, *V. P.s;* Ray K. Osborn, *Sec.* and *Treas.;* G. R. Carpenter, *Gen. Supt.;* Earl Fox, *Asst. Supt.;* C. L. Boone, Anadarko, Okla., T. R. Smith, Wewoka, Okla., R. B. Graves, Laverne, Okla., *Mgrs.* 295.31 miles, 2- to 6-inch.

Susquehanna Gas Co., Ninth & Hamilton Sts., Allentown, Pa.

J. S. Wise, Jr., *Pres.;* L. W. Heath, *V. P.;* C. M. Walter, *Sec.* and *Treas.* 82 miles, 3- to 14-inch.

T

Texoma Natural Gas Co., 20 N. Wacker Drive, Chicago, Ill.

W. A. Jones, *Pres.;* Floyd C. Brown, *V. P.* and *Gen. Mgr.;* R. Ogarrio, *V. P.;* S. E. Campbell, *Sec.;* E. H. Johnston, *Treas.;* E. V. Kesinger, *Gen. Supt.;* G. M. Davidson, *Ch. Engr. and Supt. of Oper.;* R. G. Strong, *Supt. of Pipe Lines;* W. H. Davidson, *Supt of Compr. St.;* W. T. Bulla, *Supt of Tel.* and *Pressure;* M. C. Madsen, *Supt. of Constr.;* R. T. Powers, Fritch, Tex., *Supt. Sta. No. 1;* J. G. Barnhart, Fritch, Tex., *Asst. Supt. Sta. No. 1;* L. D. Williams, *Pipe Line Div. Supt.;* C. D. Richardson, *Pipe Line Dist. Supt.;* C. L. Mouch, *Meter Supt.* 227.5 miles, 4- to 24-inch.

Thompson Gas Co., Charleston, W. Va.

Company now in receivership. W. A. Larner, *Pres.;* B. A. Wise and A. F. McCue, *Trustees;* J. M. Dolan, *Gen. Supt.*

Transit & Storage Co. (Formerly Montana Pipe Line Co.) P. O. Box 150, Port Huron, Mich.

P. R. Naylor, *Pres.;* George Kelting, *V. P., Sec.* and *Treas.;* B. E. Ireson, *Asst. Sec.* and *Asst. Treas.;* E. F. Cassidy, Shelby, Mont., *Supt.* 26 miles, 2- to 4-inch.

Triangle Co., Inc., Pine Hollow Road, McKees Rocks, Pa.

J. B. Montgomery, *Pres.;* John H. Montgomery, *Sec.,* S. H. Morgan, *Treas.;* Albert M. Boch, *Supt.* 9 miles, 1½- to 8-inch.

Turner Gas & Oil Co., Bruin, Pa.

P. G. Turner, *Gen. Mgr.* 20 miles.

U

United Carbon Co., Union Bldg., Charleston, W. Va.

Oscar Nelson, *Pres.;* G. A. Williams, T. F. Koblegard, T. S. Reed, *V. P.s;* C. H. McHenry, *Sec.;* T. A. Whelan, *Treas.;* Arthur Hanson, *Asst. Sec.;* C. A. Urban, *Asst. Treas.;* C. L. Staats, *Gen. Supt. Land Dept.;* R. J. Clarkson, *Gen. Supt. Gas Dept.;* R. V. Sleeth, *Agt. Land Dept.;* E. W. Fitzwater, Clendennin, W. Va., C. R. Payne, Pikesville, Ky., Clyde Burkholder, Monroe, La., *Metermen;* Darius Morris, Clendennin, W. Va., E. F. Hagans, Pikeville, Ky., H. E. Norrick, Monroe, La., S. I. Bennett, Santanta, Kans., *Supts.;* H. W. Engstrom, Monroe, La. *Gen. Supt. La.* and *Kans.;* L. G. Clements, Monroe, La., *Asst. Supt. La.;* E. H. Shinn, Borger, Tex., *Gen. Supt. Tex.;* C. K. Springfield, Sayre, Okla., *Gen. Supt. Okla.;* S. O. Reeder, Borger, Tex., *Asst. Supt. Tex.*

United Gas Pipe Line Co., Houston, Tex.

N. C. McGowen, Shreveport, La., *Pres.;* R. H. Hargrove, *V. P.* and *Gen. Mgr.;* M. A. Abernathy, *V. P.;* S. L. Davis, *Comptroller;* J. H. Miracle, *Sec.* and *Asst. Treas.;* A. L. McClellan, *Treas.;* R. E. Hull, *Gen. Auditor.;* George D. Fiser, B. H. Winham, *Asst. Secs.;* A. D. Greene, *Ch. Engr.;* E. R. Cunningham, *Supt. Main Pipe Line;* Ed Parkes, *Supt. Field Pipe Line;* A. L. Bradford, *Supt. Compr. Sta.;* Ray Rountree, *Supt. of Measurement;* E. M. Smith, *Ch. Dispatcher;* H. E. Randall, *Industrial Fuel Engr.;* H. F. Carr, Baton Rouge, La., C. A. McDowell, Beeville, Tex., J. E. Bahan, Dallas, Tex., W. H. Kearney, J. P. Rogers, Jackson, Miss., J. G. Hicks, Monroe, La., F. B. Winbery, Iowa, La., F. E. La-

caze, Shreveport, La., R. Wetzel, Wichita Falls, Tex., *Dist. Mgrs.* 5,601.16 miles, ½- to 24-inch.

Union Gas System, Inc., and Subsidiaries, Independence, Kans.

Paul R. Johnson, *Pres.;* Donald W. Stewart, *V. P.* and *Sec.;* Stanley G. Stewart, *V. P.;* Harry F. Mitchell, *Treas.;* Vernon F. Palmer, *Mgr. Pipe Line Dept.;* Livingston J. Love, *Gen. Supt.;* Zeke White, Porter Graves, Coffeyville, Kans., C. A. Lloyd, Caney, Kans., C. C. Carson, Longton, Kans., Clyde Myers, Fredonia, Kans., Harry Ferrell, Olathe, Kans., *Dist. Supts.;* W. L. Orr, *Pur. Agt.* 858.11 miles, 1- to 12-inch.

United Natural Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.;* W. H. Locke, *V. P.;* H. S. Rose, *Sec.* and *Treas.;* M. J. Talley, *Asst. Sec.* and *Asst. Treas.;* P. L. Mulkin, *Supt. of Distribution;* A. C. Burwell, *Supt. of Sta.;* M. J. Connor, *Pur. Agt.*

Upham Gas Co., Mount Vernon, Ohio

James A. Upham, *Pres.;* C. F. Bauman, *Sec.;* C. D Jones, *Gen. Supt.*

W

Wagoner Gas Co., Wagoner, Okla.

Ed Blieden, *Trustee;* J. R. Johnston, *Mgr.;* J. J. Cobb, *Supt.* 24 miles, 1- to 8-inch.

Weleetka Pipe Line Co., Sand Springs, Okla.

R. W. McClure, *Pres.;* D. V. Sullivan, *V. P.;* T. S. Matthews, *Sec.;* C. F. Colvin, *Treas.* 20.352 miles, 4- to 12-inch.

West Texas Gas Co., P. O. Box 1121, Lubbock, Tex.

A. R. Jones, Kansas City, Mo., *Pres.;* P. C. Spencer, New York, N. Y., E. A. Sickels, Tulsa, Okla., M. D. Snyder, Amarillo, Tex., R. F. Hinchey, *V. P.s;* George Baird, New York, N. Y., *Sec.* and *Treas.;* E. C. Wagner, Box 637, Amarillo, Tex., *Gen. Supt.;* R. M. Curry, *Asst. Supt.;* T. J. Sutherland, *Main Line Supt.;* E. B. Mitchell, Plainview, Tex., *Compr. Sta. Supt.;* T. S. Whitis, *Supt. Gas Measurement;* E. D. Parker, *Pur. Agt.* 836.6 miles.

Wheeler Gas Co., Wheeler, Tex.

45 miles, 2- to 4-inch.

Gasoline Pipe Line Personnel

A

Arkansas Fuel Oil Co., Shreveport, La.

190 miles, 8- and 10-inch. For personnel, see Crude Oil listing.

B

Bessemer Natural Gas Co., Bessemer, Lawrence County, Pennsylvania.

William Hedegore, *Pres.* and *Gen. Mgr.;* Leonard Shelley, *V. P.;* Leonard Levinson, *Sec.* and *Treas.* 12 miles, 2- to 4½-inch.

D

Detroit Southern Pipe Line Co., Chicago, Ill.

C. B. Watson, *Pres.;* D. D. Irwin, Henry Hauseman, *V. P.s;* C. H. Jay, *Sec.* and *Treas.;* J. H. Botkin, *Comptroller;* B. W. Winters, Hamtramck, Mich., *Supt.* 86 miles, 6-inch.

Duval Gasoline Co., Second National Bank Bldg., Houston, Tex.

D. W. Hovey, *Pres.;* J. W. Blue, *V. P.;* L. E. Loeffler, *Sec.* and *Treas.;* D. S. Wallace, Box 773, Benavides, Tex., *Supt.;* J. C. Nelson, *Office Mgr.;* L. D. Hare, J. R. Jones, Jr., B. C. Harrison, Allen Wiseman, all of Benavides, Tex., *Engrs.* 25 miles, 4- to 14-inch.

G

Great Lakes Pipe Line Co., P. O. Drawer 3116, Kansas City, Mo.

Dan Moran, Ponca City, Okla., *Pres.;* Harry Moreland, *V. P.* and *Gen. Mgr.;* James J. Cosgrove, Ponca City, Okla., *V. P.* and *Gen. Counsel;* P. A. Ward, *Sec.* and *Treas.;* R. L. Bosworth, New York, N. Y., *Asst. Sec.* and *Asst. Treas.;* C. G. McClintock, *Asst. Sec.* and *Asst. Treas.;* E. H. Skinner, *Gen. Supt.;* F. E. Richardson, *Ch. Engr.;* Bland Proctor, *Mgr. Legal, Right of Way, Claims, Ins.;* C. A. L. Walker, *Traf. Mgr.;* H. F. Swindle, *Pur. Agt.* 2,080.66 miles, 4- to 8-inch.

H

Hanlon Pipe Line Co., National Bank of Tulsa Bldg., Tulsa, Okla.

D. E. Buchanan, *Pres.;* J. H. Boyle, *V. P., Sec.* and *Treas.;* C. E. Wharton, Gladewater, Tex., *Gen. Supt.;* G. H. L. Kent, Gladewater, Tex., *Supervisor.* 35.306 miles, 4- to 8-inch

K

Keystone Pipe Line Co., 260 S. Board St., Philadelphia, Pa.

J. W. Van Dyke, *Pres.;* R. H. Colley, R. C. Tuttle, H. G. Schad, *V. P.s;* B. G. McKain, *Sec.;* Paul Shuman, *Treas.;* J. M. Williams, *Supt. Pipeline Oper.;* C. F. Preuss, *Supt. Pump Sta.;* R. H. Lynch, *Supt. Metering, Pipe Protection and Testing;* W. S. Schmidt, *Supt. Rights-of-Way;* R. B. O'Neal, W. E Stainback, *Dist. Supts. Maintenance;* Lloyd Baxter, V. P. Keister, *Div. Foremen;* 652.5 miles, 4- to 12-inch.

L

Lone Star Gasoline Co., 1915 Wood St., Dallas, Tex.

L. B. Denning, *Pres.;* D. A. Hulcy, E. F. Schmidt, *V. P.s;* D. L. Cobb, *Sec.* and *Treas.;* J. R. Jarvis, *Gen. Supt.;* P. C. Coffin, *Asst. Gen. Supt.;* Harry Wheeldon, Box 341, Ranger, Tex., *Field Supt.;* C. R. Rogers, Ranger, Tex., *Asst. Field Supt.;* Forrest Ford, Plant 108-2, Ranger, Tex., J. A. Bates, Brooks Plant, Box 1452, Breckenridge, Tex., L. R. Herring, Plant 101, Ranger, Tex., W. H. Bollinger, Plant 103, Ranger, Tex., J. F. Byas, Plant 108, Ranger, Tex., L. M. Cawley, Plant 109, Eastland, Tex., *Ch. Engrs.;* J. F. Francis, Rt. 1, Cisco, Tex., J. M. Kindle, Box 236, Trinidad, Tex., F. H. Townsend, Gordon, Tex., Joe Phillips, Petrolia, Tex., H. C. Wells, Hollis, Okla., *Plant Supts.* 289 miles, 2- to 16-inch.

GUN-METAL GATE and STOP VALVES for general purposes
CAST-IRON (semi-steel)— ditto, ditto
CAST and FORGED STEEL VALVES for high pressures and temperatures

Newman, Hender & Co. Ltd
WOODCHESTER GLOS. ENGLAND.

NEWMAN-MILLIKEN GLANDLESS LUBRICATED PLUG VALVES in GUN-METAL, CAST-IRON (semi-steel) and CAST STEEL, RECTANGULAR and ROUND ports, for working pressures to 3,000 lbs. per square inch

P

Phillips Pipe Line Co., Bartlesville, Okla.

A. W. Hubbell, *Pres;* Cecil L. Hunt, E. G. Hatheway, *V. P.s;* W. E. Fowler, *Sec.* and *Treas.;* E. L. Carter, Box 148, Phillips, Tex., E. L. Reed, Box 397, Wichita, Kans., J. E. Earnest, Box 109, Paola, Kans., N. F. Ferrell, Box 268, Kansas City, Kans., S. V. Montgomery, Rt. No. 1, Box 57, East St. Louis, Ill., *Supts.;* George Winters, Stinnett, Tex., B. E. Plummer, Drawer X, Pearman, Tex., Glenn Phillips, Rt. No. 2, Booker, Tex., Jess Bradshaw, Rt. No. 3, Box 118, Laverne, Okla., H. G. Panter, Box 107, Buffalo, Okla., C. D. Traywick, Aetna, Kans., R. L. Coleman, Box 133, Medicine Lodge, Kans., W. D. Griffith, Box 98, Attica, Kans., H. R. McPherson, Box 188, Cheney, Kans., E. M. Pancake, Jr., Box 543, Eldorado, Kans., E. A. Hess, Box 1, Cassoday, Kans., Charles F. Higgins, Box 353, Madison, Kans., Seth Tyler, Rt. No. 1, Waverly, Kans., E. T. Eisele, Richmond, Kans., D. H. Wilkinson, Box 308, Olathe, Kans., J. B. Jones, Box 318, Harrisonville, Mo., G. E. Humphrey, Leeton, Mo., C. R. Plummer, Rural Route, Florence, Mo., A. J. Kaullen, Box 295, Jefferson City, Mo., McKinley Johnson, Swiss, Mo., Earl Durbin, Villa Ridge, Mo., *Ch. Engrs.;* O. P. Miller, 1232 Broadway, Kansas City, Mo., *Supt. Maintenance;* B. R. Kidd, Box 474, Burlington, Kans., *Ch. Mech.* 799 miles, 6- and 8-inch.

S

Richfield Oil Corp., 555 S. Flower St., Los Angeles, Calif.

129 miles, 2- to 8-inch. For personnel, see Crude Oil listing.

Shell Oil Co., 100 Bush St., San Francisco, Calif.

147.75 miles, 3- to 6-inch. For personnel, see Crude Oil listing.

Standard Oil Co. of California, 225 Bush St., San Francisco, Calif.

22.5 miles, 6-inch. For personnel, see Crude Oil listing.

Standard Oil Co., The (an Ohio Corp.), Midland Bldg., Cleveland, Ohio.

W. T. Holliday, *Pres.;* A. M. Maxwell, A. A. Stambaugh, *V. P.s;* F. H. Kelly, *Sec.;* W. J. Semple, *V. P.* and *Treas.;* E. A. Brown, *Mgr. Pipe Line Dept.;* E. F. Morrill, *Asst. Mgr. Pipe Line Dept.* 158 miles, 5- to 8-inch.

Socony-Vacuum Oil Co., Inc., White Eagle Division, Kansas City, Mo.

H. K. Phipps, Wichita, Kans., *Supt. Pipe Lines;* L. R. Dickinson, Wichita, Kans., *Ch. Engr.* 175 miles, 6-inch.

Susquehanna Pipe Line Co. (Sun Pipe Line Co. of Delaware Holding Co.), 1608 Walnut St., Philadelphia, Pa.

J. N. Pew, Jr., *Pres.;* J. Edgar Pew, Frank L. Hadley, *V. P.s;* Frank Cross, *Sec.* and *Treas.;* R. W. Bowers, *Ch. Dispatcher;* B. K. Morse, *Ch. Engr.;* Raymond F. Hadley, *Elec. Engr.;* L. M. Miller, *Supervisor of Meters;* F. H. Guthrie, Oakmont, Pa., J. E. Ford, Honeybrook, Pa., *Div. Supts.* 506 miles, 2- to 8-inch.

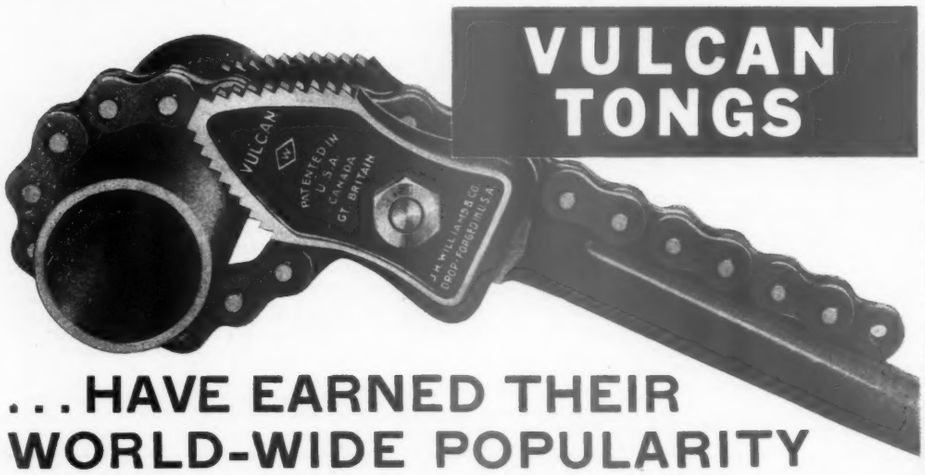
U

U. S. Pipe Line Co., 35 East Wacker Drive, Chicago, Ill.

D. D. Irwin, *Pres.;* Henry Hauseman, *V. P.;* C. H. Jay, *Sec.* and *Treas.;* J. H. Botkin, *Comptroller;* E. A. McCadden, Marcus Hook, Pa., *Terminal Supt.;* Walter Hagestad, Marcus Hook, Pa., *Asst. Terminal Supt.;* R. L. Elliott, Marcus Hook, Pa., *Supt.* 58 miles, 5-inch.

Union Oil Co. of California, 617 W. Seventh St., Los Angeles, Calif.

170 miles, 2- to 12-inch. For personnel, see Crude Oil listing.



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Also "VULCAN SUPERTONGS"

The maximum in Chain Tong Strength. Same design but drop-forged from Alloy and High Tensile steel, heat-treated and equipped with Alloy "SUPERCHAIN." 50% greater strength than regular "Vulcan" Tongs of corresponding size and weight. 8 sizes for 1/8" to 18" pipe.

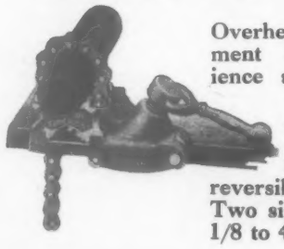
. . . *And*

TWO FAMOUS VISES

"VULCAN"

The *original* chain pipe vise — small — compact — unbreakable—fast in action. Four sizes for pipe, 1/8 to 8 inches.

"VULCAN SUPERIOR"



Overhead adjustment for convenience and speed — adjusting handle "above the bench". Jaws reversible for wear. Two sizes for pipe, 1/8 to 4-1/2 inches.

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275 Spring Street New York

Headquarters for: Drop-Forged Wrenches (Carbon and Alloy). Detachable Socket Wrenches, Reversible Ratchet Wrenches, "C" Clamps, Lathe Dogs, Tool Holders, Eye Bolts, Hoist Hooks, Thumb Nuts and Screws, Chain Pipe Tongs and Vises, etc.

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SUPERIOR DROP-FORGED TOOLS

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now handles 65,000,000 barrels annually of crude oil and refined petroleum products. Ideally located for oil terminaling and refining plants, and for quick dispatch and turn-around of oil tankers. Combined storage facilities, 10,000,000 barrels capacity.

Excellent oil refinery and terminal sites are still available on reasonable bases, despite the fact that four modern oil refineries with terminals and three additional oil terminals are already located in Texas City. Dock facilities provided at reasonable tariff rates.

For full particulars, address:

TEXAS CITY TERMINAL RAILWAY COMPANY

H. J. MIKESKA,
Vice President and General Manager
TEXAS CITY, TEXAS

FIELD OPERATIONS

Summarizing the Week's Developments

OKLAHOMA—A 3,512-bbl. well was completed in the Coal County side of the Jesse field and a 1,100-bbl. well in the new Southeast Braman pool in Kay County.

KANSAS—A 2,946-bbl. well in the south end of the Bloomer pool in Barton County and a flock of wells in the Zenith pool in Stafford County, ranging in initial production from 667 bbls. up to 3,640 bbls., were features. The Ainsworth pool in Barton and Laton pool in Russell County are being extended.

TEXAS—Ohio Oil Co. completed its first discovery well in the Gulf Coast in Matagorda County, on a large block of acreage. Two extensions to the Eureka field bring it closer to the Houston city limits, and a deeper sand discovery is recorded for the pool. The Fairbanks field was extended. A new pool was opened in Starr County, Southwest Texas, and the Frio-Vicksburg trend was extended. In the Hull-Silk pool in Archer County the best well yet found in the 4,300-foot sand gauged 128 bbls. in three hours. In West Texas the Slaughter pool in Hockley County was extended 3¼ miles northeasterly. Deep tests in Pecos and Crane counties were abandoned as dry. In Fisher County an odorless, noncombustible gas was discovered in a wildcat, leading to the thought that a small helium deposit may have been uncovered.

LA-ARK-TEX—Following the discouraging report from Columbia County, Arkansas, last week, comes the report of a 550-bbl. well in the southeast offset to the Magnolia pool discovery well. A new pool is being opened in Nevada County producing heavy gravity oil. In North Louisiana, a gas blowout in a Shreveport wildcat making 12,000,000 feet of gas, introduces hazard into town-lot operations there. The well was controlled. In southern Louisiana the Baton Rouge field and the Woodlawn field in Jefferson County were extended.

ILLINOIS—Fifty-six new wells with initial daily production of 17,950 bbls. in the past week broke recent state records. Notwithstanding the number of completions, the rigs, drilling wells and locations increased to 395.

KENTUCKY—Eight wells aggregating 1,900 bbls. in initial production were finished in the Birk City pool in Henderson and Daviess counties.

MICHIGAN—Allegan County in Southwest Michigan continued to lead in results with 12 completions in the county. In the Freeman pool in Clare County acid treatment increased production in two wells to 1,200 bbls. and 2,500 bbls. a day.

CALIFORNIA—A 5,000-bbl. well was completed in the East Coalinga field proving 1,200 additional acres in the field.

INDIANA—Sun Oil Co. completed two wells in Posey County in extreme southwestern Indiana, one good for 137 bbls. and the other 30 bbls. in six hours. The latter well is a McClosky lime test, bottomed at 2,658 feet.

Completions in All Fields

(Week Ending September 17, 1938)

	Oil	Gas	Dry	Total	1938 total comp. to date	1937 total comp. to date
N. Y., Pa. and W. Va.	41	13	6	60	2,704	3,224
Ohio	7	9	9	25	709	882
Indiana	2	0	0	2	70	70
Kentucky	12	0	4	16	629	454
Illinois	56	2	9	67	1,038	143
Michigan	21	0	11	32	608	571
Kansas	24	2	10	36	1,156	1,903
Oklahoma	23	2	12	37	1,252	2,047
Texas:						
North Central Texas	41	2	20	63	2,293	2,107
West Texas	32	1	10	43	1,418	1,999
Texas Panhandle	6	1	1	8	416	555
East Texas	26	0	0	26	1,409	1,723
East Central Texas	3	0	2	5	253	524
East Texas Border	3	0	0	3	105	268
Gulf Coast Texas	26	0	2	28	952	1,136
Southwest Texas	26	2	10	38	1,486	2,434
Total Texas	163	6	45	214	8,332	10,746
North Louisiana	7	1	4	12	462	481
Gulf Coast Louisiana	4	0	6	10	339	339
Total Louisiana	11	1	10	22	801	820
Arkansas	5	0	2	7	172	112
Montana	4	0	1	5	73	163
Wyoming	4	0	1	5	113	82
Colorado	0	0	1	1	9	16
New Mexico	9	1	2	12	404	556
Utah	0	0	0	0	2	2
California	20	0	4	24	946	1,112
Total United States	402	36	127	565	19,027	22,903
Total previous week	316	47	122	485		
Difference	86	11	5	80		

Outstanding Fields--Highlights

(Week Ending September 17, 1938)

FIELD—	Rigs up	Wells drlg.	Weekly oil completions	Initial prod.	Total No. oil wells	Daily av. prod.
TEXAS						
K-M-A.	68	77	15	9,851	780	15,300
Hastings	2	8	2	1,046	582	18,730
Saxet	0	6	0	0	618	28,515
East Texas	25	32	26	1,104	25,614	368,498
Ector County	11	72	13	15,478	1,266	39,596
Winkler County	6	11	5	5,090	1,697	35,799
OKLAHOMA						
St. Louis	7	26	2	309	687	19,300
Oklahoma City	4	10	0	0	1,091	105,250
KANSAS						
Barton County	3	25	1	2,946	358	11,823
Stafford County	3	21	5	8,911	170	4,229
Rice County	5	20	4	3,213	1,205	28,692
Russell County	5	20	2	162	1,132	25,913
NEW MEXICO						
Lea County	10	78	9	2,465	1,851	100,130
LA-ARK-TEX						
Rodessa, La-Ark-Tex	2	10	3	965	1,028	71,525
Cotton Valley (deep)	1	15	1	1,030	89	9,915
Lisbon, La.	2	1	2	1,035	262	6,825
Schuler, Ark.	4	23	4	1,525	93	18,675
Jennings, La.	2	14	0	0	118	24,827
MICHIGAN						
Overisel	6	14	6	4,579	32	6,800
ILLINOIS						
Central Illinois	43	303	56	17,950	963	67,641
CALIFORNIA						
Wilmington	3	14	7	4,601	559	92,550
KENTUCKY						
Birk City	5	28	8	1,900	54	4,500

Illinois and Kentucky

Fifty-Six Oil Wells Added to Central Illinois Basin Fields

By STAFF CORRESPONDENT

MATTOON, Ill., Sept. 19.—All the producing counties in the Illinois fields contributed to the large number of completions recorded in the past week. The usual number of wildcat dry holes were reported from various outlying counties.

Completed Wells

Completed work, with sand records and first 24-hour production, will be found below:

In Wayne County Pure Oil Co. No. 2 Schuyler, C W half SW SE Section 22-1n-7e, McClosky pay at 3,113-20 feet, flowed 707 bbls. in 24 hours through 1½-inch choke. Pure Oil Co. No. 3 Schiele, C E half SE SW Section 22-1n-7e, pay at 3,128-32 feet, flowed 289 bbls. in 24 hours through 1-inch choke. Pure Oil Co. No. 4 Clay, C W half SW NE Section 27-1n-7e, pay at 3,114½-17½ feet, flowed 347 bbls. in 24 hours through 2-inch tubing; Pure Oil Co. No. 1 A O. A. Towns, C E half NW NE Section 27-1n-7e, pay at 3,090-95 feet, flowed 1,586 bbls. through casing which had been perforated.

In the Salem field, Marion County, Texas Co. No. 1 C Reed B, SW NE SE Section 31-2n-2e, Benoist sand at 1,724 feet, total depth 1,766 feet, flowed 306 bbls. in six hours (through casing three hours and tubing three hours). Texas Co. No. 1 Ed Tate B, NE SE SW Section 31-2n-2e, sand at 1,768-1,811 feet, 700 bbls.; Max Conrey and others No. 1 West Nation School, SW cor. NE Section 33-2n-2e, sand at 1,838-53 feet, flowed 350 bbls. in 24 hours through 2-inch tubing half open.

In Clay County Pure Oil Co. No. 6 Weller, C W half NW NW Section 4-2n-8e, pay at 3,003-20 feet at intervals, flowed 497 bbls. in 24 hours. Pure Oil Co. No. 1 Margaret Bunn, C E half SE NE Section 17-2n-8e, pay at 2,985-90 feet, 150-bbl. pumper after acid treatments. Andy Bruner No. 2 Kuforth, NE NE NW Section 30-2n-8e, pay at 2,977-84 feet. Flowed 175 bbls. naturally through tubing. Pure Oil Co. No. 1 Wilkin Consolidated, C E half SW SE Section 29-3n-8e, pay at 3,025-30 feet, acidized with 5,000 gallons, flowed 794 bbls. Pure Oil Co. No. 2 C. D. Duff B, C S half NE SE Section 32-3n-8e, pay at 2,970-77 feet, acidized with 5,000 gallons, flowed 958 bbls.

In Richland County, Pyramid Petroleum Co. No. 3 Sly, SW SE SE Section 22-4n-10e, McClosky pay at 3,016-35 feet, acidized with 2,000 gallons, flowed 500 bbls. through tubing. Texas Co. No. 1 B. F. Doty, SE NE SE Section 27-4n-10e, pay at 3,091-3,202½ feet, acidized with 5,000 gallons, 160 bbls. on the pump. Texas Co. No. 2 Winters, SE SE NE Section 27-4n-10e, pay at 3,067-71½ feet, acidized with 5,000 gallons, 187 bbls.

In Fayette County, Canary and others No. 2, SE NE NE Section 12-7n-2e, Cypress sand at 1,534-63 feet, pumped 152 bbls. A. J. Hausman No. 1 Stinebring, NE NW SE Section 12-7n-2e, sand at 1,573-78 feet, pumped 100 bbls. of oil and 10 per cent water. Kingwood Oil Co. No. 5 Yolton, SW SW NW Section 7-7n-3e, Benoist sand 1,605-14 feet, pumped 119 bbls.; No. 6 Yolton, SW SW NW Section 7-7n-3e, Stein sand at 1,484 feet, total depth 1,533 feet, pumped 224 bbls. W. M. Angle No. 2 Ferguson, SE cor. NE NW NW Section 18-7n-3e, Weller sand at 1,505-32 feet, 200 bbls. Max Pray No. 3 Ferguson, C W half NW NW Section 18-7n-3e, Weller sand at 1,508-40 feet, shot with 20 quarts, pumped 290 bbls. Carter Oil Co. No. 1 Hohman, SE NE NE Section 10-8n-3e, total depth 1,635 feet, plugged back to Weller sand at 1,494-1,501 feet and gun perforated, flowed 42 bbls. of oil and some gas. Whisenant and others No. 3 Lilly, SE SW SE Section 16-8n-3e, Bethel sand at 1,563-59 feet, shot with 40 quarts, flowed 208 bbls. in eight hours, later flowed 600 bbls. in 24 hours. J. P. Babcock No. 4 Rhodes, CWL W half SE Section 27-8n-3e, Bethel sand at 1,581-91 feet, shot with 30 quarts, 123 bbls. of oil and 10 bbls. of water (estimated). Magnolia Petroleum Co. No. 1 Della Rhodes, NE SE NW Section 27-8n-3e, Benoist sand at 1,546-62 feet, 194 bbls. of oil and 22 bbls. of water. Magnolia Petroleum Co. No. 1 Buzzard, NW SW NE Section 29-8n-3e, Benoist sand at 1,437-69 feet, flowed 400 bbls.; same company's No. 2 Buzzard, NE SW NE Section 29-8n-3e, sand at 1,430-56 feet, shot with 40 quarts, flowed 33 bbls. per hour. Texas Canadian Oil Co. No. 1 Ireland, SE NE SW Section 31-8n-3e, Cypress sand at 1,537-47 feet, pumped 75 bbls. Yokey and others No. 2 Long, SE NE SW Section 31-8n-3e, Weller sand at 1,536 feet, total depth 1,604 feet, 60 bbls. Oil, Inc. No. 1, NW NW NE Section 32-8n-3e, Weller sand at 1,479-89 feet, Benoist sand at 1,546-70 feet, 16 bbls.

In Wayne County, H. H. Weinert No. 2 Twist, SE NW SW Section 33-2s-7e, had pay at 3,316-27 feet, flowed 120 bbls. in four hours through 1-inch choke.

In the Salem area of Marion County, Texas Co. No. 3 Carroll, SW NE NE Section 6-1n-2e, 89 bbls. in three hours through 2-inch tubing, without a shot, from sand at 1,692-1,732 feet. Texas Co. No. 2 Corbin, SE SE NE Section 6-1n-2e, Benoist sand at 1,727½-41 feet, total depth, flowed 250 bbls. through 1-inch choke in 24 hours. H. H. Weinert No. 1 Foster, NW SE SE Section 7-1n-2e, sand at 1,790 feet, total depth 1,810 feet, flowed 410 bbls. in 23 hours through three-quarter inch choke on 2-inch tubing. Anderson and others No. 1 English, SE cor. NW SW Section 8-1n-2e, Benoist sand at 1,795 feet, total depth 1,845 feet, flowed 275 bbls. through one-half inch choke in 24 hours. Mammoth Producing & Refining Co. No. 2 Bachman, NW SE SW Section 9-1n-2e, Benoist sand top at 1,887½ feet, total depth 1,910 feet, flowed 130 bbls. Texas Co. No. 1 E. Luttrell, NW NE NW Section 16-1n-2e, Benoist sand at 1,897-1,917 feet, pumped 92 bbls.

In Marion County, C. F. Frazer No. 1 Grosch, SW SE NW Section 18-1n-1e, Benoist sand at 1,378-85 feet, shot with 5 quarts, 80 bbls.; Hawley Oil Corp. No. 1 Gratman, SW SW SW Section 18-1n-1e, sand at 1,350-75 feet, shot with 40 quarts, 103 bbls.; Texas Co. No. 2 Reed C, NE NE NW Section 5-1n-2e, sand at 1,669-1,713 feet, 919 bbls. through tubing; Texas Co. No. 1 Richardson, NE NE NE Section 6-1n-1e, sand at 1,722-65 feet, 124 bbls. through 1-inch choke, stopped flowing in four days; Texas Co. No. 2 M. Williams, CWL SW SW Section 32-2n-2e, sand at 1,643 feet, total depth 1,687 feet, 422 bbls. in 19 hours, mostly through three-quarters inch choke; Texas Co. No. 5 Williams, SW SW SW Section 32-2n-2e, sand at 1,653-90 feet, 653 bbls. in 17½ hours through casing and tubing.

In Clinton County, Shell Petroleum Corp. No. 2 Hanseman, NE NW SE Section 1-1n-1w, Benoist sand at 1,339-50 feet, shot with 10 quarts, pumped 30 bbls. of oil and 4 bbls. of water; Hardy and others No. 1 Ross, SE NE SE Section 12-1n-1w, sand at 1,368-89 feet, pumped 180 bbls.; W. C. McBride, Inc., No. 4 Allison, C SE NE Section 12-1n-1w, sand at 1,370½-85½ feet, shot with 30 quarts, pumped 88 bbls.; Linier Oil Co. of Louisiana No. 1 Panzan, SE cor. SW SE NE Section 13-1n-1w, Benoist sand at 1,351-78 feet, dry and abandoned; Iroquois Oil & Gas Co. No. 1 Rogers, SW cor. NE NW NE Section 24-1n-1e, Benoist sand at 1,380-89 feet, shot with 10 quarts, pumped 50 bbls.; Milhahan No. 1 Bogard, near NW cor. NE NE Section 24-1n-1w, sand at 1,371-83 feet, shot with 5 quarts, 12 bbls.; Ryan and Anderson No. 1 George Koelling, NE SW NE Section 24-1n-1w, sand at 1,371-83 feet, shot with 10 quarts, 40 bbls.; Harrison Schmesseur No. 1 Beachman, NE cor. SE NW NE Section 24-1n-1w, sand at 1,383-92½ feet, shot with 10 quarts, 60 bbls.; W. B. Smith No. 1 Shaw, NE NW NE Section 24-1n-1w, sand at 1,369-82 feet, shot with 10 quarts, pumped 200 bbls.; Shell Petroleum Corp. No. 5 Criley, SE SE SE Section 35-2n-1w, sand at 1,331-59 feet, shot with 17 quarts, 114 bbls.

In Lawrence County, Trio Oil Co. No. 1 Trueblood, SW SW SW Section 14-3n-11w, Bridgeport sand at 972 feet, hole full of water, total depth 2,000 feet, abandoned; Chester Harris and others No. 1 Hurt, CSL N half E half SW Section 22-3n-11w, Buchanan sand at 1,376 feet, hole full of water, Ste. Genevieve lime at 1,766 feet, total depth 2,044 feet, abandoned; Ohio Oil Co. No. 19 Leeds, NW NW SW Section 15-3n-12w, Buchanan sand at 1,285-1,302 feet, flowed 40 bbls. naturally.

In Cass County, Edward Duval No. 1 Bowen, NW NW SE Section 30-17n-12w, dry and abandoned at 800 feet.

In Wabash County, Mahugh and others No. 14 Krogan, SE cor. NE Section 2-1n-12w, sand at 1,394-1,428 feet, shot with 80 quarts, 65 bbls.; J. D. Toomey Estate No. 18, NE SW NW Section 3-1n-12w, Bethel sand at 1,482-1,501 feet and Jordan sand at 1,912-50 feet, both shot with 80 quarts, 10 bbls.

In Richland County, Pure Oil Co. No. 1 Hattie C. Norris and others, C E half SE SW Section 29-3n-9e, pay at 2,950-55 feet and 2,960-62½ feet, flowed 250 bbls.

Illinois Fields

HIGHLIGHTS OF THE WEEK: The Salem field, opened by the Texas Co. is steadily approaching the city of that name, several miles northeast of the discovery well. The field is now about 5 miles long and 3 miles wide.

Daily production of new pools is 67,641 bbls. and old fields 11,110 bbls., total 78,751 bbls.

Completed oil wells, 56; new operations including locations, rigs and drilling, 395.

Wildcat Completions

Wildcats extended the Salem field in Marion County, and opened a pool in Wayne County, but seven wells were definitely reported as dry and two others reported abandoned at a shallow depth. The counties of Marion, Clay, Fayette, Morgan, Washington, Franklin, Randolph and Jackson figured in the past week's crop of abandoned tests.

Iroquois Oil Co. No. 1 Phillips, NE NE NW Section 1-1n-1e, Marion County, was dry and abandoned at 1,728 feet.

Anna Bell Oil Co. No. 11 Schlageter, NE SE SW Section 5-1n-1e, Marion County, was dry and abandoned at 1,823 feet, Bethel sand was topped at 1,781 feet.

Conrey Baldwin and others No. 1 West Nation School, SW cor. Section 33-2n-2e, had pay at 1,838 feet, total depth 1,860 feet, and flowed 350 bbls. in 24 hours through 2-inch tubing half open. This test extended the Lake Centralia field closer to Salem, Marion's county seat, but approaching even closer was Haynes & Thomas Drilling Corp. No. 1 Lee, SE SW SW Section 28-2n-2e, which swabbed and flowed 86 bbls. the first 3½ hours from Bethel sand, total depth 1,726 feet.

In Clay County, Duncan Oil Co. No. 1 Ullom, C W half SW NW Section 22-2n-8e, was dry and abandoned at 3,100 feet.

In Fayette County, Phillips Petroleum Co. No. 1 Perryman, NE NE NW Section 3-8n-1e, had McClosky

lime top at 1,770 feet, St. Louis at 1,820 feet, and was abandoned as dry at 1,822 feet.

In Morgan County, Waverly Oil Co. No. 1 Dora Hubbs, C E half E half E half Section 33-14n-8w, which had the base of the Devonian lime at 1,357 feet and the top of the Maquoketa at 1,357 feet, was abandoned at 1,685 feet.

In Washington County, Morris No. 1 George Marquard, SE NW SW Section 33-1s-5w, was abandoned at 900 feet.

H. E. Sloan and associates No. 1 Walker, C NW NW NW Section 16-3s-9e, came back as an oil producer and a pool opener. It showed as a natural oil producer from McClosky lime at 3,420-38 feet, but when twice acidized with 1,500 and then with 5,000 gallons, it died, and when put on the pump produced only salt water. The owners continued to pump the salt water into pits and the well began flowing again through the casing at the rate of about 150 bbls. of oil per day and was completed. It is about 9 miles east of any other production in Wayne County.

In Franklin County, J. Garfield Buell, a veteran Mid-Continent wildcatter and oil producer, had no luck with his No. 1 Forrest, SW SE NE Section 4-5s-1e. It appears to have missed the McClosky lime and was abandoned at 3,103 feet. Ste. Genevieve top was found at 2,709 feet, Fredonia at 2,713 feet, St. Louis at 2,835 feet and Salem at 3,098 feet.

In Randolph County, Scholsberg and others No. 1 Hayer, SE NW Section 4-5s-6w, was reported abandoned at 350 feet.

In Jackson County, Eason Oil Co. No. 1 Bowlin, SE SE NE Section 12-7s-2w, topped McClosky lime at 1,767 feet and drilled to 1,891 feet, where the test was abandoned as dry.

Christian County: Swords & McDougall No. 1 Warren, NW SE SE Section 23-11n-1e, set 12½-inch casing at 44 feet and drilling at 260 feet.

Shelby County: O. J. Connell No. 1 Laeding, SE SE NE Section 30-11n-5e, set 10-inch casing at 990 feet, drilling at 1,025 feet.

Coles County: Thompson Drilling Co. No. 1 Degler, SE SE NE Section 9-12n-7e, location.

Edgar County: Bearcey and others No. 1 Blair, near C NW NW NE Section 24-14n-14w, shut down at 330 feet. E. Lapsley No. 1 Roll, SW SW NE Section 17-14n-13w, shut down at 400 feet.

Piatt County: Max Pry No. 1 Baker, SW NE NE Section 17-17n-6e, drilling at 2,145 feet.

Menard County: Arthur Scroggins No. 1 fee, C SW SW Section 24-19n-5w, shut down at 1,555 feet, plugged-back depth.

Champaign County: Barber & Seiver No. 1 Lindsey, C NW SE Section 20-20n-8e, drilling at 263 feet.

Southern Wildcats

Washington County: Morris and others No. 1 Henry Beguiln, SW SW NW Section 12-1s-1e, rigging up rotary; Hull, Stoffer & Boughter No. 1 Williams, SE SW SE Section 7-2s-3w, shut down for repairs at 350 feet; Bitterman No. 1 Bonk, C SE NE SW Section 16-3s-2w, saturated sand at 1,030-45 feet, drilling ahead; Adventure Oil Co. No. 1 Kcychi, SE SE NW Section 30-3s-1w, moving in core drill.

Jefferson County: Sam Jennings and others No. 1 Patton, NW NE SW Section 1-1s-1e, drilling at 1,258 feet; Dr. Moore No. 1 Moore, SE NE NW Section 16-3s-5e, set 12-inch casing at 803 feet and drilling at 1,145 feet; Benedum-Trees, Inc., No. 1 Jefferson Oil & Gas Co., C NW NE Section 16-4s-2e, drill stem test at 2,580-2,607 feet, open 15 minutes, 50 feet of mud and small show of oil, coring at 2,660 feet for McClosky lime; Price & Parker No. 2-A Hamilton, 40 feet west of No. 2, SW SW NW Section 20-4s-2e, Fredonia top at 2,910 feet, drilling at 3,027 feet.

Randolph County: Cain and others No. 1 Smiley, SE SE NE Section 31-4s-5w, drilling at 960 feet; Arnes Drilling Co. No. 1 Nicholson, NW SE NW Section 12-5s-9w, spudded with a machine; Badger Oil Co. No. 1 Schroeder, SE NW NW Section 27-6s-6w, drilling at 360 feet.

Franklin County: Adams Oil & Gas Co. No. 1 Old Ben Coal Co., SW SW NE Section 19-5s-2e, drilling at 3,003 feet.

Perry County: T. T. Eason No. 1 Perfection Coal Co., NW SE NE Section 17-6s-1w, drilling at 1,665 feet.

Saline County: Carpenter and others No. 1 Sloan, SE SE SW Section 32-7s-6e, shut down for repairs at 1,450 feet.

White County: Flaherty & Wayneburg No. 1 Choisser, NE NW NW Section 5-8s-7e, drilling at 875 feet.

Williamson County: Geological Oil Syndicate No. 1 Scott, SW SE SW Section 4-10s-2e, drilling at 1,604 feet.

Johnson County: Elzie No. 1 John Boner, C SW NE Section 30-11s-3e, shut down at 115 feet.

Edwards County: Leach Brothers No. 1 Lee, SW NE SE Section 11-1s-10e, shut down at 3,428 feet.

Wildcat Drilling

Marion County: Gray & Blalock No. 1 Doctor Welch, E half NE NW Section 2-1n-1e, derrick; Thompson Drilling Co. No. 1 Wright, C NE SE NE Section 8-1n-1e, drilling at 1,641 feet; R. E. Dalton No. 1 Ira Dalton, NW SE NE Section 19-1n-1e, shut down at 2,300 feet; R. E. Dalton No. 1 Clifton, NE SW SW Section 15-1n-4e, shut down at 2,682 feet; Boyce and others No. 1 Foster, C NW NW SE Section 10-2n-1e, shut down at 1,340 feet; Oil Royalties No. 1 Suggs-Meeker, C W half NW NW Section 11-2n-1e, drilling at 1,150 feet; Jay Copps No. 1 Wesner, SW SW NW Section 24-2n-1e, rigging up machine; Shobe Engineering Corp. No. 1 Morey, SE SE Section 4-4n-1e, shut down at 200 feet for repairs; Wanner and others No. 1 Young School, NE NW SE Section 20-2n-2e, rigging up standard tools, total depth 1,743 feet; Sheppard and others No. 1 Greer, SW NE SW Section 30-2n-2e, total depth 1,946 feet, hole full of water, plugged back to 1,191 feet; Pyramid Petroleum Co. No. 1 Roddy, SE SE SW Section 20-2n-3e, shut down at 2,207 feet; Coyer No. 1 Mulvaney, SE NE SE Section 6-2n-4e, total depth 1,210 feet, moving in rotary; Hansky No. 1 Yoos, NW NE NE Section 6-1n-1e, drilling at 100 feet; Anna Bell Oil Co. No. 1 Adams, NE SW NW Section 3-1n-1e, shut down for repairs at 508 feet; Superior Oil Co. of California No. 1 Luttrell, SW SE SE Section 4-1n-2e, derrick; Frontier Oil & Gas Co. No. 1 Fyke School, NW NE SW Section 17-1n-2e, drilling at 1,265 feet; Weinert No. 1 Foster, near NW cor. SE SE Section 7-1n-2e, Bethel sand at 1,790-1,824 feet, flowed 421 bbls. in 24 hours through three-quarters inch choke; Haynes & Thomas Drilling Corp. No. 1 Lee, SE SW SW Section 28-2n-2e, swabbed and flowed 86 bbls. the first 3½ hours from Bethel sand topped at 1,725 feet; Conrey, Baldwin and others No. 1 West Nation School, extreme SW cor. Section 33-2n-2e, Bethel sand at 1,838 feet, total depth 1,860 feet, set 5½-inch casing at 1,839 feet, flowed 350 bbls. in 24 hours through 2-inch tubing half open.

Clinton County: Watkins & Wright No. 1 Wise, 75 feet from north and 600 feet from west lines SE quarter Section 24-1n-3w, showing of oil at 670 feet, set 8 inch casing at 711 feet, cleaning out; Farrelly and others No. 1 Bergman, NW SW NW Section 30-1n-3w, set 10-inch casing at 520 feet and drilling ahead; Sappington and others No. 1 Hilgeman, SE NE NW Section 22-3n-3w, total depth 1,060 feet, pulling 6-inch casing; M. & K. Oil Co. No. 1 Keaner, NE NW NE Section 10-3n-2w, drilling at 1,214 feet.

Fayette County: C. C. Cole and others No. 1 Grider, NE SW SW Section 12-6n-3e, derrick; Whisenant and others No. 1 Rexwinkle, near N line SE NE Section 20-6n-3e, drilling at 1,050 feet; W. M. Angle No. 1 Brubaker, SW SW NW Section 21-6n-3e, location; Rosenthal No. 1 Washburn, near NE cor. SE NW Section 30-6n-3e, Weller sand at 1,599-1,622 feet, total depth, swabbed 340 bbls. of oil in 20 hours, later swabbed 15 bbls. per hour, putting on pump, an extension well; Ruwald & Johnson No. 1, 320 feet from N and 1,305 feet from E lines of NE quarter Section 28-7n-3e, spudded with machine; Hurricane Creek No. 1 Eddie Eckard, C NW NE Section 15-6n-1w, moving in machine; Putnam and others No. 1 Farmer, C SE SE Section 35-6n-1w, location; Rockwood No. 1 Coper, SW SW NE Section 9-8n-1e, spudded; Frank Bemer and others No. 1 Frank Wald, NE SE NE Section 29-9n-1e, moving in machine; Whisenant and others No. 1 Zanders, C SW SE NW Section 36-9n-3e, Bethel sand at 1,655-70 feet, total depth 1,672 feet, bailing and cleaning out, will put on the pump.

Cumberland County: National Consumers Oil Co. No. 1 Harrison-Ward, NE SE NE Section 17-9n-9e, shut down at 1,725 feet; Ray Fisher and others No. 1 Rows Cable, NE NE NE Section 27-9n-9e, rigging up rotary for a McClosky lime test.

(Continued on Page 257)

Niagara Pool to Be Tested for McClosky Pay; 8 New Wells

OWENSBORO, Ky., Sept. 19.—Eight oil wells were completed in the Birk City field in Henderson and Daviess counties in the past week with a total initial production of 1,900 bbls.

Benedum-Trees, Inc., and others No. 2 Mrs. W. S. Calhoun and others in Davies County is a 200-bbl. well from Cunningham sand at 1,732-44½ feet, total depth 1,745 feet. Jess Ashby and others No. 1 Mrs. C. E. Jagoe Estate, started at 200 bbls. a day from McClosky lime, total depth 1,872 feet. It is also in Daviess County as are Major Oil Co. No. 1 Theresa Peters Estate, good for 250 bbls. from McClosky lime at 1,850-60 feet, W. E. Hupp and Snowden & McSweeney No. 5 Mrs. L. Taylor Estate, which made an estimated 200 bbls. from McClosky lime at 1,874-86 feet and A. C. R. Oil Co. No. 1 E. L. Newton lot, which flowed close to 200 bbls. from McClosky pay, depth not ascertained. On the other hand Major Oil Co. No. 1 Prudential Insurance Co. missed the McClosky and was dry at 1,890 feet, but may be drilled deeper. Across the river in Henderson County, Carter Oil Co. No. 5 O. L. Boswell west tract made a 150-bbl. well in McClosky pay, but Aetna Oil Service Co. did better, with a 450-bbl. well from the same formation in No. 2 C. A. Dempwolf. Pay lay at 1,866-81 feet, total depth 1,892 feet. Carter Oil Co. and W. E. Hupp No. 2 Mauzey-Gatewood Estate started at 250 bbls. from McClosky lime, depth not ascertained. Only five new operations were started in the Birk City area in both counties.

Following is a list of new operations in Western Kentucky and completions outside the Birk City field.

Butler County, Mt. Zion School district: Cumberland Petroleum Co. and Snowden & McSweeney No. 3 E. V. Harper was a dry hole; No. 4 was good for 25 bbls. from Jett sand, total depth 190 feet. Huntsville district: W. E. Hupp and others No. 2 V. A. Harrison was a dry hole, total depth 195 feet.

Daviess County, Birk City district: I. B. and Frank Hamilton No. 1 Birk City School Lot, drilling in; Benedum-Trees and others No. 3 Mrs. W. S. Calhoun and others, rigging up; Bailey-Bond, Hayes & Fitzpatrick No. 2 R. M. Hagan north 100 acres, rigging up; Aetna Oil Service Corp. No. 2 G. M. Morrison, drilling in and No. 3 drilling at 1,100 feet; Major Oil Co. No. 1 Straney Lot, moving in. Panther district: Major Washburn and others No. 2 Lewis Iglehart, moving in. Oklahoma district: Walter Richards and others No. 1 J. W. Shiveley, drilling at 250 feet.

Hancock County, Easton district: J. C. Ellis No. 12 W. C. Smith, 10-bbl. well in Jett sand.

Henderson County, Birk City district: Carter Oil Co. No. 1 Ollie Benham, 20 acres, rigging up; Imperial Oil & Gas Co. and others No. 1 Bertie Gibson, coring McClosky.

Ohio County, Maxwell district: J. H. Wilson No. 3 G. E. Barr Estate, drilling at 210 feet. Fordsville district: A. J. Stewart and others No. 21 E. S. Dunn, dry hole through Jett sand; Elvis Dehart No. 7 John Eskridge, dry hole through Jett sand; Rex-Pyramid Oil & Gas Co. No. 1 W. P. Smith, rigging up. Adaburg district: Leeper Oil Co. No. 6 E. Ford, 10 bbls. a day from Jett sand at 765-80 feet. Oklahoma district: Ellis & Ashby No. 2 Louis Howard, dry hole through Barlow sand; B. & B. Oil Co. No. 1 Patton, rigging up.

The first McClosky test in the Niagara section of Henderson County, where numerous small producers have been drilled in shallow sands, is under way. The Imperial Oil & Gas Products Co. is drilling on the Frank Mauzey tract and will go to the McClosky.

Locations have been made by the Carter Oil Co. for wells on the Wimsett lease, offsetting the Calhoun lease, near Hambleton's ferry in Daviess County, and on the Ollie Benham 20-acre tract in Henderson County. The Benham location is 1,000 feet northwest of the one-acre Ollie Benham well which came in as one of the largest in the field. The well on the Wimsett lease is to be drilled to the Cunningham sand in which Post and others got a good well on the Calhoun tract.

North Louisiana, Arkansas

By
GEORGE WEBER

Gas Blow-Out at Shreveport; Good Well in Magnolia Pool

SHREVEPORT, La., Sept. 19.—The Shreveport pool in Caddo Parish was the center of attention during the past week, as a gas blowout in one of the drilling wells threatened considerable damage in the outskirts of the city. New locations and an increase in drilling operations in the Shreveport vicinity added to interest.

Outpost wells to the Schuler and Lodi fields attracted attention, and the testing of the D sand in the Cotton Valley field was an important development.

The drilling of an unexpected gas sand on the north edge of Shreveport last week resulted in a serious blowout which ran wild for over two days before being shut in. The R. L. Bauman No. 1 Slattery Estate, NW cor. Section 35-18-14, just north of the city limits, was drilling at 2,550 feet, in the Tokio sand, early Wednesday morning, when the well went out of control. It blew wild making gas, sand and water, with the estimates on gas production averaging 10,000,000 to 12,000,000 feet daily.

M. M. Kinley of Houston was called to close the well in, and by Friday morning it was successfully stabbed and closed. The Tokio sand gave no trouble from gas pressure in Allison No. 1 Ellerbee, discovery well of the field. The experience with the Bauman blowout will result in the forming of strict safety rules, probably requiring blowout preventers, heavy equipment and constant control of mud in future drilling tests.

No preparations had been made to deepen the well by the end of the week, but it was expected it would be drilled ahead to the field's producing horizon in the Pettit lime at 5,550 feet.

Outpost Has Showing

A 7-mile southeast outpost to the Allison producer, in the Broadmoor section south of Shreveport, also reported a showing of gas during the week. The F. W. Martin and Superior Oil Corp. No. 1 Querbes, Section 20-17-13, set a string of 9⅝-inch casing at 4,046 feet. The wildcat topped the main anhydrite stringer at 4,055 feet, which showed it to be running about 10 or 12 feet higher than the Allison well. Operators were drilling ahead below 4,900 feet at the week-end.

With drilling operations gaining in the immediate vicinity of the discovery well on the north edge of the city, another wildcat was staked south of the city. The Hollywood Oil Corp. is rigging up on No. 1 C. & C. Realty Co. near the Mansfield road in the center of NE NE Section 22-17-14.

In the Bisteneau area of Bienville Parish, the De Soto Oil & Gas Co. No. 1 Fleming, a 3-mile outpost to the gas-distillate discovery well of the field, has had 7-inch casing run to 5,390 feet. Total depth is 5,525 feet, and operators were running tubing for a reported completion in the field horizon. The well is running 230 feet lower than the discovery well. Information on this test is being generally withheld.

A large gasser was completed in the Sugar Creek field of Claiborne Parish by Union Producing Co. The well, No. 1 Hodges, made an initial gauge of 5,000,000 feet of gas, with 5¾-inch casing set at 5,603 feet and total depth at 5,700 feet.

Cotton Valley Operations

The Cotton Valley field attracted attention due to developments in three separate tests. The North American Consolidated Oil Co. No. 1 Burrow, a northwest edge test, continued on production tests. The well, second to be completed for an oil producer in the lower Marine Bodcaw sand, gauged 25 bbls. per hour on a 28/64-inch choke with tubing pressure 400 pounds and casing pressure 1,000 pounds. The gravity of the oil has increased from 44 to 46 degrees.

A workover of Standard Oil Co. of Louisiana No. 1 Stewart, southwest edge Bodcaw sand producer is attracting interest among Cotton Valley producers. The test was killed in the Bodcaw in the past week, and plugged back to 8,530 feet in the D-sand stringer immediately above the Bodcaw. Perforations were shot at 8,512-22 feet. At latest reports the well gauged 174 bbls. of oil on a half-inch choke, flowing by heads.

This is the second well brought into production from the D sand. The first was Midstate Oil Corp. No. 1 Welori Lumber Co., which was completed several weeks ago on the south edge of the field. Operators decided to recomplete the Stewart well which was a gas-distillate producer in the Bodcaw, after studying the production record of the Midstates well.

The deepest test yet to be drilled in Cotton Valley, Hunt Oil Co. No. 8 Babb, C SW SW Section 13-21-10, this week had 7-inch casing set at 8,996 feet. The test is bottomed at 9,017 feet. Top of the Bodcaw is 8,255 feet, top of the Davis sand 8,534 feet and the F sand was cored at 8,635-55 feet. No. 8 Babb will be completed as a Bodcaw producer.

Lodi Outpost

The Lodi section of southwestern Rodessa in Marion County, Texas, has a currently interesting northwest outpost. The Bateman Drilling Co. No. 1 Eliza Jaynes in the Douthet Survey reported a show of gas at 5,500-10 feet, and is drilling ahead. The well is reported running 230 feet higher than wells in the Lodi area proper.

In Webster Parish, Magnolia Petroleum Co. No. 1-C Pardee, a deep flank test in the Carterville gas field, tested dry with a slight show of gas at 6,028 feet, and is drilling ahead in red shale at 6,640 feet. Travis Peak was topped at 6,054 feet.

Production by Pool

Estimated daily gross production all companies week ending September 16:

NORTH LOUISIANA

	Barrels
Bellevue	585
Caddo light	4,015
Caddo heavy	2,365
Converse	490
Cotton Valley heavy	90
Cotton Valley light	*9,915
Cross Lake	†850
De Soto and Red River	1,370
Elm Grove	355
Haynesville	3,200
Holly	105
Homer	2,675
Lisbon	6,825
Pleasant Hill	125
Rodessa	34,645
Sarepta-Carterville	‡425
Sligo	1,400
Sugar Creek	280
Urania	2,700
Zwolle	3,215
Total	75,630

SOUTH ARKANSAS

Buckner	1,480
Champagnolle	1,055
El Dorado	1,840
Lisbon	265
Miller County	390
Nevada	620
Rodessa	6,135
Schuler	18,675
Smackover light	2,055
Smackover heavy	16,000
Stephens	560
Troy	1,200
Urbana	1,180
Village	435
Total	51,890

Texas side of Rodessa field 30,745 bbls. daily.

*2,785 bbls. is distillate.
†Cross Lake located north of city limits of Shreveport, Section 27-18n-14w, Caddo Parish. Gravity 44. Only one well producing 850 bbls. daily.
‡205 bbls. is distillate.

Magnolia Well

The Magnolia field of Columbia County, Arkansas, gained one good producer, following the abandonment of three tests last week. The G. H. Vaughn No. 1 Garrett, C NE SE Section 14-17-20, a southeast offset to the discovery well, came in making 534 bbls. in 22 hours on a quarter-inch choke, with gas production estimated at 1,000,000 feet. Tubing pressure was 1,350 pounds and casing pressure 800 pounds. Seven-inch casing was set at 7,536 feet and the well is bottomed at 7,552 feet.

The Atlantic Refining Co. abandoned two tests in the Magnolia area after they proved failures in the Smackover lime producing horizon of the field in the previous week. No. 1 Baker was quit at a total depth of 7,779 feet, and No. 1 Harrington was abandoned at 7,789 feet. One test was three locations east and the other two locations west of the discovery well.

The Schuler field has a new southwest edge producer as E. M. Jones No. 1 K. Gallagher, Section 18-18-17, came in for a good producer in the Jones sand.

In Nevada County, Texas Canadian Oil Corp. No. 1 Stocks, discovery well of a new field lying on the Falcon graben, is being completed on the pump. The well, perforated in the Nacatoch sand at 1,197-1,203 feet, bailed 25 bbls. of fluid, consisting of 85 per cent oil and 15 per cent salt water. While awaiting pumping unit, the hole filled with 800 feet of fluid. The oil is heavy, averaging 12 degrees in gravity.

N. Y.-Penna. Gas Fields

COUDERSPORT, Pa., Sept. 17.—G. L. Cabot, Inc., completed another small well in the restricted Bingham Township field in Potter County during the past week. Its test on the West Bingham grange farm reached the Oriskany sand at 4,901 feet, found the first gas show at 4,905 feet and was completed at a total depth of 4,905 feet. It had an initial open flow of 3,700,000 feet per day with a rock pressure of 870 pounds.

Two dry holes had been drilled in this township earlier this year, where a 6,000,000-foot well had been completed last year. This production is on the Hebron anticline.

This was one of two completions during the week, the second being that of the New York State Natural Gas Co. on the L. E. Hanes farm in Harrison Township, also Potter County. This well found the top of the Oriskany at 4,701 feet, encountered the first gas show at 4,707 feet and was completed at a total depth of 4,118 feet. It had an initial open flow of 10,500,000 feet with a formation pressure of 945 pounds.

Two new locations were also staked during the week both of them in New York by the G. L. Cabot, Inc., one on the Charles Crane No. 2 farm in Woodhull Township, Steuben County, and the other on the Empire-Rogers farm in Alma Township, Allegany County.

At the same time Cabot is moving in material for a test on the Charles Crane No. 1 farm, Woodhull Township, is drilling at 865 feet on the George Hotaling farm, this township, and at 325 feet on the Elmer Downey farm, West Union Township. New York State Natural Gas Co. is drilling at 345 feet on the Parks Estate No. 2 farm, the lone remaining active Woodhull Township operation. Clancey and others are building the rig for a wildcat test on the D. Hovey farm in Addison Township, Steuben County.

Two Willing Township, Allegany County, wells were cased into the Onondaga during the past week and should be drilled in shortly. These are the Empire Producing Co. well on the Floyd Wilson farm which is drilled to 4,854 feet with the top of the Onondaga set tentatively at 4,837 feet, and the Penn York well on the Cyrus Wilson farm which is down 4,861 feet with the top of the Onondaga at 4,851 feet. Belmont

(Continued on Page 264)

North and East Texas

By D. H. STORMONT

West Extensions to K. M. A. Area Indicated by Two Tests

WICHITA FALLS, Tex., Sept. 19.—Interest in North Texas over the past week centered on two tests being drilled by Consolidated Oil Co. as west extensions to the K.M.A. field. The company's No. 1 Ancell, which indicates a possible 4-mile extension over into Wilbarger County, is being plugged back to perforate and test a section from 3,935-96 feet. On tests from 4,065-95 feet several bailers of oil were recovered, but operators believe the higher horizon offers better possibilities. The same operator's No. 1 Griffin extended the K.M.A. pool 1 mile west when it flowed 100 bbls. in three hours on Railroad Commission gauge. The test is in Section 9, Block 7, H.&T.C. Survey and pay was logged from 3,965-91 feet.

Archer County

Largest producer in the 4,300-foot sand, or the second pay horizon in the Hull-Silk pool of northern Archer County, was seen in Blackwell Oil & Gas Co. and Helmerich & Payne, Inc., No. 3 Wilson, in the southeast corner of Block 25, A.T.N.C.L. Survey. The test was completed on official gauge for 128 bbls. of oil in three hours.

Montague County

Montague County received a deep wildcat test when Gibson & Jenkins made location for their No. 3 Howard, in the Kaufman County School lands, Section 90, about 10 miles northeast of Nocona. The test is a proposed 3,600-foot rotary and is on a block on which two dry holes, one to 2,000 feet and one to 3,000 feet, have been drilled.

NORTH TEXAS COMPLETIONS

Archer County

H. H. Fraser No. 14 L. F. Wilson B, 878 feet, dry. H. A. Schaeffer No. 3 W. P. Ferguson A, 3,840-62 feet, 480 bbls. Shappell Oil Co. No. 11 G. Bell, 978-1,008 feet, 100 bbls. Sikes and others No. 1 W. Ford, 4,204 feet, dry. C. H. Staley and others No. 4 Mrs. Anna Mangold, 3,762-3,862 feet, 600 bbls. Underwood & Campbell No. 29 R. Campbell B, 1,031 feet, dry.

Clay County

Houston Bowers No. 3 C. J. Shumake, 1,119-38 feet, 20 bbls. Duncan Arnhold & Duncan No. 1 T. P. Duncan, 1,132-42 feet, 45 bbls. Marvin Hudson No. 3 State Lands, 1,082-1,112 feet, 25 bbls. Joellen Oil Co. No. 2 State Lands, 1,082-1,113 feet, 88 bbls. Metzner & Burns No. 9 L. Thornberry A, 205-11 feet, 4 bbls.; No. 10 L. Thornberry A, 196-205 feet, 10 bbls.

Cooke County

O. M. Murray and others No. 7 F. J. Truebenbach, 965 feet, dry. Texas Co. No. 10 Tony Truebenbach, 787-816 feet, 63 bbls. Trumter Petroleum Corp. No. 8 Mrs. C. E. Stacey, 754-64 feet, 50 bbls.

Jack County

Cochburn Oil Co. No. 1 E. E. Silton, 3,210 feet, dry. Martex Oil Co. No. 7 A. B. Kuykendall B, 3,229-3,771 feet, 276 bbls. J. Sewell No. 2 D. R. Sewell, 310-27 feet, 5 bbls. Tebay and others No. 1 E. F. Smith, 2,691-2,839 feet, 9,500,000 feet of gas.

Montague County

N. H. Martin & Son No. 1 J. S. Ivins, 2,301 feet, dry.

Wichita County

J. C. Barnard No. 2 Fassett & Tuttle, 3,920-4,006 feet, 500 bbls. Bell Oil & Gas Co. No. 11 H. Willis, 1,492 feet, dry. Bishop Oil & Gas Co. No. 2 Waggoner B, 3,788-3,832 feet, 768 bbls. The Bonner Co. No. 1 W. L. Hodges, abandoned location. Consolidated Oil Co. No. 1 Mrs. J. James, 3,935-84 feet, 1,896 bbls. Continental Oil Co. No. 6-B Waggoner C, 3,750-89 feet, 728 bbls. Deep Oil Development Co. No. 1 J. A. Kemp B, 3,802-3,904 feet, 25 bbls. E.C. Oil Co. No. 3 G. W. Lewis A, 3,854-3,868 feet, 600 bbls. Fain-McGaha Oil Corp. No. 2 E. P. Griffin A, 3,784-3,840 feet, 984 bbls. Hammon, Hanlon-Buchanan No. 12-A Fassett & Tuttle, 865-77 feet, 35 bbls.; No. 3 W. H. Hammon, abandoned location; No. 4 W. H. Hammon, abandoned location; No. 1 W. H. Hammon, abandoned location. George J. Greer No. 3 Sue Mitchell, 3,840-64 feet, 625 bbls. Hanlon-Buchanan, Inc., No. 1 Fassett & Tuttle C, abandoned location. King Oil, Perkins & Cullum No. 2 Charles Pettit-State of Texas, 3,870-3,907 feet, 1,004 bbls. Mitchell & Dorian No. 1 S. B. Burnett, 4,056 feet, dry. Rathke Oil Co. No. 15 William Murray, 822 feet, dry. Shell Petroleum Corp. No. 3 R. L. Kempner, 3,782-3,880 feet, 147 bbls. Stidham & Thrasher No. 2 J. A. Seay, 3,641-3,843 feet, 480 bbls. Texas Co. No. 3 First National Co.-Kemp, 3,736-3,835 feet, 448 bbls. S. K. Viersen No. 3 R. L. Kempner, 3,777-3,842 feet, 566 bbls.

Young County

Less Lawley No. 1 J. A. Watkins, 3,757-3,805 feet, 10 bbls. Pemeta Oil Co. No. 4 Cole, 742 feet, dry. Sams & Watson No. 7 F. M. Cullers, 560-626 feet, 10 bbls. Texas Co. No. 16 Miss Annie Beardon, 1,227 feet, dry. E. D. Willis No. 1 Graham Stewart B, 835-50 feet, 105 bbls.

EASTERN TEXAS

DALLAS, Tex., Sept. 19.—The Flag Lake pool of northwestern Henderson County was the center of interest in Eastern Texas when a new producer was completed and indications of another which will extend production farther southwest. Humble Oil & Refining Co. completed No. 2 Hearne for 274 bbls. of oil per day from 3,055-57 feet. Last week Humble No. 1 Hearne came in flowing 113 bbls. Interest now centers on Texas Co. No. 1 J. P. Tarkington, one-half mile southwest outpost. Six feet of saturated sand has been cored and 5½-inch casing is set at 3,024 feet. Production tests will be made next week. Three new locations were made in the pool last week. DeArmand staked No. 1 A. B. Tarkington approximately 1,000 feet northeast of the Texas Co. gas well on the tract. Humble Oil & Refining Co. staked an offset to its No. 2 Hearne and L. T. Davis has offset Texas Co. No. 1 J. P. Tarkington on the east. At present oil is being hauled out of the field by trucks, but several more producing wells will probably lead to a pipe line being installed in the area.

Navarro Crossing Field

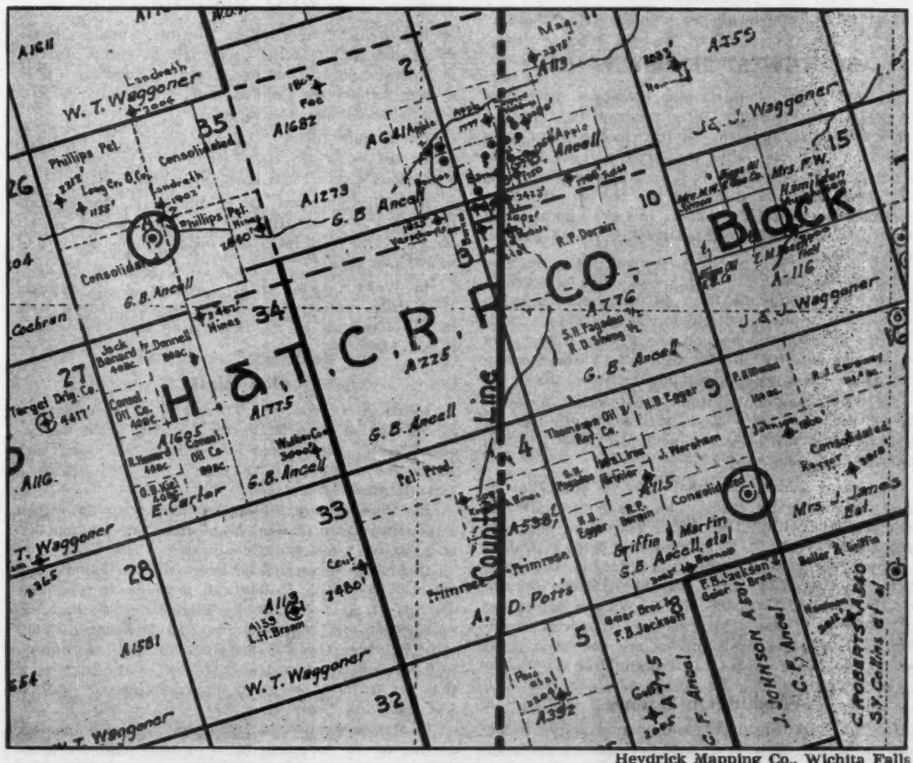
Another gas well has been completed in the Navarro Crossing field of northwestern Houston County. It is Humble Oil & Refining Co. No. 1 J. A. Hill, in the John La Riviere Survey, east of the discovery well for the area. The well was drilled to a total depth of 5,965 feet and found water in the Woodbine sand. Casing was cemented at 5,902 feet and the hole was plugged back in the casing to 5,823 feet where it was perforated from 5,820-23 feet and completed for a dry gas producer.

EAST TEXAS FIELD COMPLETIONS

Gregg County—Longview Area

Cities Service Oil Co. No. 19 Bumpas, 3,488-3,563 feet.

(Continued on Page 256)



Consolidated Oil Co. No. 1 Ancell, a prospective 4-mile extensioner into Wilbarger County and the same company's No. 1 Griffin, 1-mile west extension to the K.M.A. pool

Eastern Field Report

By STAFF CORRESPONDENT

Two 100-Bbl. Wells in Ohio; Good Oriskany Sand Gasser

PITTSBURGH, Pa., Sept. 19.—Operations were routine in the lower Eastern fields during the past week. Twenty-seven operations were completed, of which 6 were dry, 12 gas wells, and 9 producers with a daily initial of 253 bbls., most of which was in Southeast Ohio.

SOUTHEAST OHIO

In Southeast Ohio, Coshocton County, Allen Willy and others completed a test on the A. Bryan farm in Section 19, Pike Township, in Clinton sand at 3,279 feet. It produced 100 bbls. the first day after shot, and will probably settle to a 25-bbl. pumper.

In Licking County, McClay Brothers completed No. 5 U. G. Porter, Section 13, Fallsbury Township, in Clinton sand, total depth 3,090 feet, and it produced 100 bbls. the first day after a shot.

In Cuyahoga County, on the lake front of the city of Cleveland, W. Shear and others deepened the test on the Whiskey tract to the Clinton sand at 2,800 feet. It produced 8 bbls. the first day before shot. It had formerly been drilled in the Newburg sand about a year ago.

In Knox County, Kundtz Hulse, Inc., completed No. 6 Levey A. Stone farm, in Section 10, Jackson Township, in the Clinton sand at a depth of 3,205 feet. It will make a 15-bbl. pumper, and has a small showing of gas.

In Perry County, Preston Oil Co. completed No. 1666, on the Sunday Creek Coal Co. tract, in Section 36, Coal Township, in the Clinton sand at a depth of 3,780 feet without finding production.

In Washington County, E. A. Metcalf No. 2 Account and others, completed a second test on the A. J. King farm, in Section 22, Liberty Township, in the lime at 1,345 feet. It produced 7 bbls. the first day without a shot and has a gas volume of 35,000 feet a day.

SOUTHWEST PENNSYLVANIA

In Southwest Pennsylvania, Aleppo Township, Greene County, Burleigh Wright completed a test on the William McVay farm, in the Gordon stray sand topped at 3,278 feet, with a volume of 1,000,000 feet of gas per day at 3,286-92 feet. In Monongahela Township, Fred Garrison deepened the test on the Jane Stoneking farm to 2,654 feet. It was dry and is being plugged back to the Injun sand where it will make a light gas well.

In Fayette County, Doctor Spear and others drilled on the Luke Williams farm in Menallen Township through the Injun sand, and it was a dry hole. It is slightly north of the test on the Ernest Hibbs farm which was also dry. East of this failure, these operators have shut down the test on the Bates lease.

In Allegheny County, Hope Construction & Refining Co. deepened No. 4 Adam Elicker, in Plum Township, to 3,900 feet, and it was a dry hole with no Bradford sand showing.

In Greene County, Equitable Gas Co. is drilling at 2,569 feet in the test on the John Huffman farm, in Washington Township. In Greene Township, this company shut down No. 1 W. E. Blaker at 3,280 feet, with a showing of gas at 3,197-98 feet. In this township, H. D. Freeland is fishing in No. 1 I. T. Moser at 1,670 feet. In Richhill Township, W. L. Walters is drilling at 1,740 feet in the Ellsworth test. In Morris Township, R. E. Hoskinson and others are fishing at 2,100 feet in the H. W. Ealy-C. C. Conklin test.

Washington County

In Morris Township, Washington County, Union Gasoline & Oil Corp. reached 2,844 feet in No. 2 G. L. Craft. Gas at 2,708-11 feet and 2,718 feet gauged at first 380,000 feet a day, but blew down to 97,000 feet; Gordon sand at 2,831-42 feet and a hole full of water at 2,818 feet. Casing is now being run. In Fallowfield Township, Naomi Oil & Gas Co. is drilling at 2,150 feet in the James M. Williams test. In Nottingham Township, Beedle, Clark and others have reached 205 feet on the Pittsburgh Coal Co. lease. In Buffalo Township, R. M. Duden and others are down 1,080 feet on the Antonius Provanzano farm. In Hanover Township, Breadon and Herron are drilling at 700 feet in No. 3 W. N. Bell.

Deep Tests

The test of the L. J. Houze Convex Glass Co. on the Paul Dunham farm, on Chestnut Ridge, north of Wymps Gap, in Springhill Township, Fayette County, continues interesting, but now appears lower on structure than expected. It is drilling at 6,918 feet in black shale. Drilling has been retarded by cementing due to caving below the casing, set at 6,687 feet.

On the same structure, in North Union Township, Wasson & Co. are drilling at 6,205 feet on the J. H. Sorg farm with Tully lime expected shortly. In South Union Township, New Penn Development Co., William Snee and others were delayed by a fishing job at 321 feet on the Indian Creek Coal Co. land. William Johnson warrant, and the hole is being straightened. In this township, on the Piedmont Coal Co. tract, the Peoples Natural Gas Co. started drilling with a rotary and lost circulation at 86 feet and has had difficulty regaining it. The surface elevation is 2,357 feet.

In Beaver County, John T. Galey and others are drilling by the tools lost in the test on the Eliza Allen heirs farm, in South Beaver Township. The total depth was 4,652 feet with the Onondaga topped at 4,566 feet and the tools lost at 4,624 feet.

WEST VIRGINIA

In Ritchie County, West Virginia, Square Oil Co. completed No. 3 Merle Carpenter, in Grant district, in Squaw sand at 2,065 feet, and it is good for 5 bbls. a day. Schultz Oil Co. No. 3 T. C. Hammat is still making about 100 bbls. a day.

In Murphy district, Ritchie County, J. F. Deem completed No. 4 McGregor Heirs in Injun sand at 1,808 feet and it is rated good for 5 bbls. a day.

In Calhoun County, O. K. and M. C. Rogers completed No. 3 D. M. Miller in Sheridan district in Salt sand at 1,972 feet and it is good for 8 bbls. a day and 40,000 feet of gas.

In Wood County, O. G. Lowther, J. H. Shuman and others completed a test on the D. C. Little farm in Union district, in the Berea sand at 2,205 feet and it is a 5-bbl. well.

Gas Wells

In Cabell County, the Thermal Gas Co. completed a well on the Edna E. Porter farm in Grant district at 2,027 feet. Berea sand lies at 1,982-2,002 feet, with Berea gas gauging 104,000 feet a day, and having a rock pressure of 320 pounds.

In Boone County, Pond Fork Oil & Gas Co. drilled a second well on its own property in Washington district, to 2,878 feet, and it was dry.

In Lincoln County, Sand Creek Oil Co. completed a gas well on the J. L. Caldwell farm, in Harts Creek district, at 2,111 feet. Berea sand at 2,089-2,106 feet with 58,000 feet of gas per day. In Jefferson district, the Cambridge Gas Co. deepened No. 1 A. M. Mullins to 3,647 feet. It started at 2,175 feet with the Brown shale at 3,475-95 feet, and a gas volume of 150,000 feet a day, 18 hours after shot.

In Marion County, R. S. Monroe deepened the test on the W. W. Laughlin farm in Mannington district through the Bayard sand to 3,219 feet. It started with 280,000 feet of gas a day from the Bayard at 3,134-36 feet.

In Mingo County, United Fuel Gas Co. completed the test on the Nighbert Land Co. tract in the Kermit district, as a gas well at 3,265 feet. The Brown shale at 2,385-3,213 feet yielded 94,000 feet a day, 15 hours after the shot.

In Pleasants County, S. B. Glenn drilled on his own property in Jefferson district, through Cow Run sand to 850 feet, and it was a dry hole.

In Putnam County, Huntington Oklahoma Gas Co. completed the test on the B. W. Coyner farm in Scott district at 2,116 feet. Berea sand at 2,075-2,101 feet was good for 84,000 feet of gas per day, rock pressure 300 pounds.

In Ritchie County, Hope Natural Gas Co. deepened No. 6764, B. F. Phillips farm, in the Murphy district, to 1,857 feet, Injun sand, where it has a volume of 620,000 feet of gas per day.

In Roane County, O. H. Reed and others, on the H. V. Litton farm, in Harper district, drilled through Salt sand to 1,700 feet and it was dry. These operators will make another location on this farm.

In Wayne County, Southern West Virginia Oil & Gas Co. deepened the test on the A. W. Preston farm in Union district to Corniferous lime at 3,257-58 feet, total depth. Brown shale at 2,548-3,252 feet had a gas volume of 212,000 feet a day.

Oriskany Gas Field

Two wells were completed in the Oriskany gas field in Kanawha County. In Elk district, the Columbian Carbon Co. completed No. 12 C. W. Vickers at 5,258 feet, with the Oriskany topped at 5,205 feet and a final gauge of 2,300,000 feet a day.

In Poca district, Mullins Gas Co. has a volume of 1,826,000 feet of gas per day from the test on J. C. Fisher and others farm with the Oriskany sand topped at 5,162 feet and the tools drilling at 5,191 feet. The final gauge of the United Fuel Gas Co. in No. 4787 W. J. Glass in the same district was 9,327,000 feet a day, total depth of 4,935 feet.

Deep Tests

No new deep tests have been announced in West Virginia. It is doubtful if the two now under way will report a completion soon. The test of the Columbian Carbon Co. on the Giles Hammat farm, in Grant district, Pleasants County, is still fishing and cleaning out. The test of Joe Rubin on the W. J. Brown farm in Ravenswood district, Jackson County, still has the bridge in the hole after the shot and the Oriskany gas shut off tight.

New Work

In Boone County, Hope Natural Gas Co. made a location on the H. Nunnencamp and others lease in Washington district, elevation 980 feet. Cameron Oil & Gas Co. will deepen its second well on the George P. Alderson farm in Scott district, elevation 1,182.3 feet.

In Cabell County, Charles G. Peck is drilling on the Peck heirs farm in Guyandotte district, elevation 560 feet. In Gilmer County, Decker Drilling Co. made a location on the Harry and Irene Holms farm, in Troy district, elevation 736 feet. In DeKalb district, McCall Drilling Co. will drill a second test on the L. E. Ellyson farm, elevation 922 feet.

In Lincoln County, Adkins, Wilson and others will drill on the E. L. Afkins farm, in Union district, elevation 836 feet. In Lewis County, the McCall Drilling Co. has started drilling on the Danley J. Davis farm. Freemans Creek district. In Court House district. Goodwin and Watson are drilling at 1,395 feet on the C. and G. Burkhammer farm.

In Tyler County, L. G. Pigott made a location on

(Continued on Page 266)

Southwest Texas District

By F. L. SINGLETON

Starr County Has New Pool; Prospects and an Extension

CORPUS CHRISTI, Tex., Sept. 19.—The Southwest Texas district marked up another interesting week of developments, including an important extension to the Frio-Vicksburg trend, with the discovery of a new field in Starr County, and the showing of two probable pool openers in the Laredo and Balcones Fault line districts.

Sun Oil Co. No. 1 McKinney, A. J. Smith Survey No. 242, Starr County, extended the Frio-Vicksburg trend approximately 13 miles south when it flowed an initial production of 180 bbls. of 41.8-gravity oil through a 5/32-inch choke, with tubing pressure 700 pounds and casing pressure 1,000 pounds. Production is from the Frio section through perforated casing at 4,853-56 feet.

The new strike is located in the northeastern part of the county, about 30 miles northeast of Rio Grande City and 13 miles south of the recently opened Kelsey field in Jim Hogg County, where Humble Oil & Refining Co. completed No. 1 Kelsey Bass in the previous week. The Humble test was completed in the same sand section through perforated casing at 4,742-48 feet, and continues to be tested through various chokes. On a recent eight-hour gauge the well flowed 37.54 bbls. through a half-inch choke with tubing pressure 1,225 pounds and casing pressure 1,450 pounds.

Both discoveries are looked upon as the outstanding development in the district in several years, and some geologists are of the opinion that the two fields are on the same structure. To prove this theory may take several months as no large scale development is anticipated in view of the fact that both strikes are on solid blocks of 30,000 and 40,000 acres. Another factor which will curtail development is the remoteness of the locality and the lack of a pipe line outlet. Both fields are several miles from all-weather roads, supply houses, towns and railroads and the nearest pipe line is a 5-inch line owned by the Valley Pipe Line Co. in the Samfordyce field in Hildalgo County, approximately 50 miles to the south.

Magnolia's Interesting Test

As a result of the above discoveries, development in the LaReforma field, 5 miles northeast of the Sun discovery and southeast of the Kelsey field, is being watched with much interest. Magnolia Petroleum Co. is preparing to test No. 1 Guerra, 2,300 feet southwest of the discovery well. The hole is bottomed at 5,934 feet, and casing is being cemented after a 15-minute drill stem test at 5,928-34 feet, tested 1,000 pounds of working pressure and 75 feet of drilling mud cut with distillate. The discovery well, Wheelock & Collins No. 1-A Guerra, was completed in the Frio section at 5,917-69 feet. It is a distillate producer.

Additional development in the Keran field, Victoria County, was assured following the showing of Barnsdall Oil Co. No. 1 Keeran ranch, 4,500 feet northwest of production, at which the crew is preparing to test a new sand after a drill stem test showed good results. Gas sand was cored at 6,991-7,003 feet and on a 10½-minute drill stem test it recovered 450 pounds of working pressure and 200 feet of oil. Another core was taken at 7,003-08 feet, where a 25-minute drill stem test showed 1,000 pounds of working pressure and 850 feet of 40.6-gravity oil. Casing is being cemented for completion. The well is in the Martin De Leon grant on a block of 3,000 acres.

Three new tests have been started in the recently opened LaRosa field, Refugio County. Geophysical Service, Inc. (I. J. Allen) No. 3 Rooke, south of No. 1 Rooke, is drilling below 3,800 feet, while the same company is rigging up No. 1 Spaulding in Section 3, and Rutherford Oil Corp. is rigging up No. 1 J. A. Schirmer, Section 1, Bonnie View subdivision.

South Alice Outposts

Operators in the South Alice field, Jim Wells County, were watching the progress of two important outpost tests. Approximately 1½ miles north of production, Mills Bennett Production Co. and Gulf Board Oil Corp. were making a drill stem test in No. 1 Forry, after an oil odor was detected in a core from the 5,500-foot Vicksburg sand. A previous test in the Basal Frio section at 5,290-5,307 feet, recovered 90 feet of oily drilling mud and 2,400 feet of brackish water. An electrical coring test will be made to determine if the upper section has possibilities of production. The southwest extension area was extended about 2,000 feet with the completion of H. H. Howell No. 1-A Stillwell, completed for an initial production of 149 bbls. per day through a one-eighth inch choke. The sand was topped at 5,274 feet, total depth 5,300 feet. This test is north of H. H. Howell No. 1 Mosser, recently completed in a shallow sand 2½ miles southwest of production.

An attempted blowout in Shell Petroleum Corp. No. 1 Von Blucher, on the South Fremont prospect, southern part of Jim Wells County, has again attracted attention to that area. The hole is bottomed at 7,316 feet with the drill stem stuck. Several sands showing oil and gas have been cored and prospects of another pool being added to the Frio-Vicksburg trend are encouraging.

In the northeastern part of the county, Smith & McDannald abandoned No. 1 Rooney at 6,500 feet. In the Banderia gas field and 1,126 feet east of the discovery well, Magnolia Petroleum Co. No. 1 Romano is coring in sandy shale below 6,462 feet. Sand with a gas odor was cored at 6,421-26 feet, but no drill stem tests were made.

Another Government Wells sand pool was indicated for McMullen County with the showing of William H. Spice No. 1 H. C. Edrington, 5 miles east of the Loma Alta field in the A.B.&M. Survey No. 57. The hole is bottomed at 2,519 feet and casing is being cemented following a third drill stem test at 2,509-19 feet which recovered 120 feet of oil and mud through a one-eighth inch choke. Sand was cored at 2,492-18 feet.

South of the Munson field, McMullen County, Daubert and others No. 1 R. H. Corbett has been abandoned at 1,253 feet. The well is located 2½ miles south of the field in the B.S.&F. Survey No. 176. In the field proper, Bishop Oil Co. and Albright No. 1-B Nueces Land & Livestock Co. is preparing to pump from a total depth of 1,206 feet. Petroleum Producers Co. is moving in material for a test a half mile south of production.

Balcones Fault Line

Interest in the Balcones fault line district was centered on Humble Oil & Refining Co. No. 1 Schley, 3 miles southwest of the town of Schattel in Frio County, which has shown evidence of commercial production in Austin chalk as a result of a drill stem test at 4,720-85 feet. The test lasted 25 minutes and recovered 2,500 feet of pipe line oil and a good gas blow. At the close of the week additional cores were being taken. The prospective pool opener is about 19 miles northeast of the Pearsall field, where Amerada Petroleum Corp. developed production from the Navarro sand, Austin chalk, Buda and Edwards lime. A recent test in the Navarro sand showed salt water, and the well is scheduled to be drilled to the Edwards lime. For this reason it is doubtful if a production test will be made until the hole is drilled to the Edwards lime.

COMPLETED WELLS

(24-hour production)

Duval County

Benavides field: Hiawatha Oil & Gas Co. No. 16 Parr sand 4,743-54 feet, 154 bbls., 5/32-inch choke. Glenn H. McCarthy No. 5 Snyder, perforated casing 5,315-25 feet, gas well. Casa Blanca field: Magnolia Petroleum Co. No. 8 Duval County Ranch Co., sand 1,185-90 feet, 57 bbls., quarter-inch choke. Eagle Hill field: W. E. Butler and others No. 9-B Foster, perforated casing 1,502-07 feet, 35 bbls., pumping. V. G. Schimmel, sand 1,521-32 feet, 4 bbls., pumping. Fitzsimmons field: Porter Drilling Co. No. 2-B Fitzsimmons, perforated casing 4,330-34 feet, 146 bbls., 5/32-inch choke. Seven Sisters field: Reynosa Oil Co. No. 7-A Garza, 1,520 feet, abandoned. Gulf Stream, Inc., No. 14-A Garza, sand 1,488-91 feet, 4 bbls. per hour, quarter-inch choke.

Bexar County

Von Ormy field: Shadrock Oil Co. No. 16 Barragan, 660 feet, 5 bbls. pumping.

Jim Wells County

South Alice field: Blanco Oil Co.-Buchanan Drilling Co. No. 3 Rattan, perforated casing 5,292-5,303 feet, 13½ bbls., nine hours, 3/16-inch choke. Robert Bowles No. 2 Ragland, perforated casing 5,284-92 feet, 204 bbls., 3/16-inch choke. Pratt & Browning No. 1 Stilwell, 5,300 feet, 284 bbls., 3/16-inch choke. H. H. Howell No. 19 Lindsay & Reed, sand 5,288-95 feet, 152 bbls., one-eighth inch choke. Lewis Production Co. No. 1 Lemond, perforated casing 5,288-5,306 feet, 6 bbls. per hour, one-eighth inch choke.

Live Oak County

Ezzell field: A. C. Grimes No. 1 Gason, 1,784 feet, abandoned.

Nueces County

Luby field: Seaboard Oil Co. No. 12 Shaefer, perforated casing 5,058-61½ feet, 144 bbls. quarter-inch choke. Stanolind Oil & Gas Co. No. 12 Spessard, 5,063 feet, 121 bbls., one-eighth inch choke. Stanolind Oil & Gas Co. No. 2 Kampthenke, 5,330 feet, 68 bbls., quarter-inch choke. West Saxet field: Renwar Oil Co. No. 4 McKenzie, perforated casing 5,803-68 feet, 11 bbls. per hour, 5/32-inch choke. Southern Minerals Corp. No. 2 French, perforated casing 3,854-62 feet, 180 bbls., jetting.

Refugio County

Tomoconnor field: Copano Oil Co. No. 16-B O'Connor, 5,920 feet, 562 bbls., quarter-inch choke. Hewitt & Dougherty No. 77 Lambert, 5,911 feet, 618 bbls., quarter-inch choke. Quintana Petroleum Co. No. 8 Bauer, 5,925 feet, 1,105 bbls., three-eighths inch choke.

San Patricio County

East White Point field: Plymouth Oil Co. No. 2-D Cole, perforated casing 5,653-57 feet, 132 bbls., 7/64-inch choke. Quintana Petroleum Co. No. 71-A O'Connor, 5,930 feet, 780 bbls. quarter-inch choke.

Victoria County

Heyser field: Gulf Oil Corp. No. 5 Schultz, perforated casing 5,622½-26½ feet, gas well. Magnolia Petroleum Co. No. 9 Lander, 5,582 feet, 91 bbls., 9/64-inch choke.

Zapata County

Comitas field: Gilcrease Oil Co. No. 26-B Haynes, 1,103 feet, abandoned. J. P. Nash No. 32 Haynes, 1,165 feet, 25 bbls., pumping.

Caldwell County

Salt Flat field: Millican & Norman No. 2 Merriweather, 2,731½ feet, 20 bbls., pumping. Wiegand No. 3-A Briscoe, 2,717½ feet, 62 bbls., pumping.

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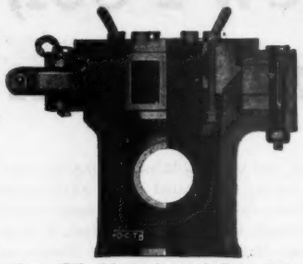

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Among the Drilling

TRINITY DRILLERS, INC. of San Antonio, Tex., has started drilling operation on Phillips Petroleum Co. No. 1 T. F. Mastin, a wildcat 6 miles southwest of Clarkwood in Nueces County, Southwest Texas. One operation is reported for the same company in the West Saxet field, while four other active operations are located in Duval, Nueces and Jim Wells counties for Al Buchanan, Carlos Oil Corp., Continental Oil Co. and Transwestern Oil Co.

G. W. DRILLING CO. of Dallas, Tex., has received the development contract from the Texas State Board of Mineral Development for the drilling of 16 wells on the Big Wichita River bed traversing the K.M.A. field of Wichita County, North Texas. The wells will be on the 210-acre tract recovered in an agreed judgment ending litigation with the Venmex Oil Co. Members of the board estimate the contract will yield the state $2,075,000. The permits for the drilling were issued as an exception to the general spacing rule and the wells will be 1,000 feet apart. The company paid a bonus of $5,250 for the contract, which stipulates the state is to receive 25 per cent royalty until the company recovers $60,000 a well, after which the state will own the wells outright. When the wells require pumping, the state may have the company standardize them for $6,500 each, payable out of 75 per cent of production. If the company operates the wells, the state will pay 10 cents a barrel while flowing and 20 cents a barrel while pumping.

OIL WELL DRILLING CO. of Dallas, Tex., is drilling four wells for Phillips Petroleum Co.-Pure Oil Co. interests on the C. Cowden lease in the Harper pool of Ector County, West Texas. Phillips-Pure No. 37 C. Cowden is coring streaks of saturation below 4,158 feet. No. 39 is waiting on cement after setting casing at 4,030 feet. Saturation was cored from 4,121-39 feet, total depth. No. 40 is fishing for stuck 7-inch casing after having encountered saturation from 4,085-4,121 feet. No. 41 is drilling below 3,481 feet.

ARROW DRILLING CO. of Odessa, Tex., completed one of its own wells as the most eastern producer in the Foster pool of Ector County, West Texas, and is drilling, on contract, three other tests for Landreth Production Co. in the Cummins-Goldsmith pool in the same county. The drilling company's No. 3 Foster, Section 8, Block 42, T.&P. Survey, flowed at the rate of 944 bbls. of oil per day on official gauge after being shot with 350 quarts. Pay was encountered from 3,939 feet to 4,275 feet. In the Cummins-Goldsmith pool, the Arrow company is nearing completion of three wells for Landreth Production Co. No. Q-1 Scarbauer is waiting on cement after setting casing at 4,140 feet. No. O-2 Scarbauer is testing about 30 bbls. of oil in six hours after being treated with 1,500 gallons of acid. Pay was topped at 4,173 feet. No. O-3 Scarbauer is being prepared for an acid treatment after topping the pay section at 4,160 feet.

PATRICK & TYRELL are moving a rotary rig for an interesting deep test to be drilled for British American Oil Co. and others on the southwest flank of the old Spindletop field in Jefferson County, Texas. The well is about a half mile from production on the Gladys City lease in the J. A. Veatch Survey.

H. M. HARRELL opened a new Frio sand field with completion of Ohio Oil Co. No. 1 Cornelius, about 2½ miles north of Markham in Matagorda County, Texas. Production was obtained by perforating the casing at 7,727-30 feet, and the well flowed 170 bbls. of fluid in 12 hours while cleaning out through a three-sixteenths inch choke. The rig from the discovery will be moved to the Bammel field in Harris County where No. 1 Ehrhardt will be spudded for himself and George P. Lawrence.

CROSBY DRILLING CO. is moving in a rotary to Jackson County, Texas, for No. 1 J. F. Weed which will be drilled for Texas Co. The wildcat is several miles south of Francitas in the John D. Newell Survey.

ROWAN DRILLING CO. started drilling operations on Salt Dome Oil Corp. No. 1 Ogden, a wildcat in the Douthit Survey, 6 miles south of Anahuac in Chambers County, Texas.

ALLEN & MORRIS of San Antonio, Tex., are rigging up for a "relief" well on the Missouri Pacific right of way in the Greta field, Refugio County, Texas. The hole will be drilled by directional instruments in an attempt to kill a wild well which blew out about two years ago. The crater extends several hundred feet across the right of way of the railroad as well as the state highway. In the same county and in the newly opened LaRosa field, the discovery well of which was drilled by Allen & Morris, contracts for two wells were received and drilling operations have started. No. 1 Spaulding and No. 2 Rooke are being drilled for I. J. Allen. In the

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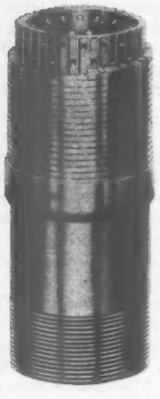

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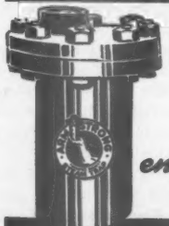

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Contractors

Refugio field, W. R. R. Oil Co. No. 3 Mission River is drilling below 4,869 feet. In Nueces County, Texas Co. No. 2 Flinn, Clara Driscoll field, is being completed through perforated casing at 5,098-5,111 feet, while at the Luby field, Seaboard Oil Co. No. 38 Luby is being tested in the 5,000-foot horizon.

JACK FRAZIER has moved one of his rotaries to Montgomery, Tex., where No. 1 Chase National Bank, a wildcat 7 miles west of the Conroe field will be drilled for himself and C. B. Bunte. The well is in the D. Garrett Survey and is a projected 8,500-foot test. Several major companies hold protection acreage in the area.

FLANAGAN DRILLING CO. received contract from Continental Oil Co. for No. 1 Oscar Chesson to be drilled on the northwest flank of the old Orange field in Orange County, Texas.

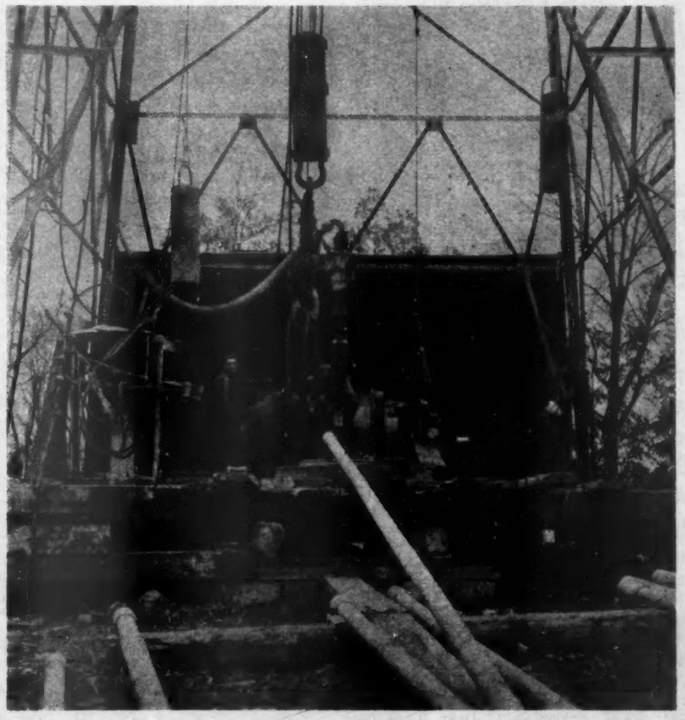
R. L. ALLISON is drilling his second test in the newly discovered Shreveport field. A west offset to his No. 1 Ellerbee, discovery well of the field, the No. 2 well is below 3,700 feet.

CRON & GRACEY extended the Fairbanks field, Texas, approximately 1,500 feet to the northeast with the completion of Moore & O'Hern No. 1 Whitehead and Rash. Three additional wells are scheduled to be drilled on the lease.

CARTER DRILLING CO. received contract from F. A. Gillespie and others for an interesting wildcat in Chambers County, Texas. The well is on the Kirby Petroleum Co. lease 2 miles northwest of the Cotton Lake field and the same distance southwest of the North Cotton Lake area in the Chambers County School Land Survey.

O'BRIEN BROTHERS of Shreveport, La., are moving a large rig into Mississippi to resume operations on Southern Natural Gas Co. No. 1 Progressive Realty Co. The test, carried below 6,600 feet by Cleve Love and others, was taken over by Southern Natural and will be deepened. It is in SE SW Section 35-6n-4w, in Hinds County.

BATEMAN DRILLING CO. is drilling an important northwest outpost test to the Lodi field of Marion County, East Texas Border. The No. 1 Jaynes showed gas pressure in a sand at 5,500-10 feet and is drilling ahead. It is reported running over 200 feet higher than wells in the Lodi area, an extension to the southwestward of the tri-state Rodessa field.



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Rocky Mountain Area

By
T. R. INGRAM

Medicine Bow Field Is Given An Increased Price for Crude

DENVER, Colo., Sept. 20.—A wildcat leasing play is developing in the Denver basin in Colorado as a result of the drilling of a deep test in Elbert County by the Plymouth Oil Co. Leases on 45,000 acres of state land in two counties have been reported recently. J. G. Tomkins & Sons have a discovery of high-gravity oil at 417 feet in Huerfano County, the well flowing by heads and then settling down. It may make from 20 to 50 bbls. per day. The Garcia Corp. No. 1 McClung, Las Animas County, was abandoned at 2,500 feet.

Wyoming had five completions and three new operations. The old Plunkett field in Fremont County has been revived with a 15-bbl. completion of 40-gravity oil at 480 feet. D. D. Gibson completed a 50-bbl. well in Warm Springs. A shallow test in Washakie County in the Fison Oil Co. No. 1 Government, was abandoned at 176 feet. The other completions were in Osage.

There were four completions, one a dry hole, in Kevin-Sunburst, and one in Cut Bank, a 75-bbl. well. Montana had four new operations.

In Northwest New Mexico, a dry hole was reported in Arriba County and a 78-bbl. well for the Continental Oil Co. on Rattlesnake.

NEW MEXICO

While 10 wells were completed in Lea County, New Mexico, none of them was of large production.

A deep test in Harding County, drilled to granite wash at 4,500 feet, was dry and abandoned. It was Sam Sanders No. 1 Sanders, C NE NE SW Section 22-14n-33e. There was no water in the granite wash.

In Lee County, Gulf Oil Corp. No. 2-E Mattern, C NE SW Section 1-22s-36e, had top of the pay at 3,710 feet, total depth 3,770 feet. The well flowed 498 bbls. in 13 hours through open tubing, and showed a gas production of 1,582,448 feet per day.

Skelly Oil Co. No. 1 Baker, C SE SW Section 22-22s-37e, an old well deepened from 3,590 feet, was shot with 160 quarts at 3,621-94 feet and flowed 53 bbls. in 24 hours through 12/64-inch choke on tubing and was recompleted.

Repollo Oil Co. No. 2 Hair, 1,650 feet from north and 330 feet from west lines of NW quarter Section 9-24s-37e, is a 24,000,000-foot gasser. Top of the pay was 3,368 feet, total depth 3,560 feet.

Addison No. 3 Knight, C NE NW Section 27-24s-37e, had top of the pay at 3,517 feet, total depth 3,561 feet, and after a 230-quart shot flowed 84 bbls. in eight hours.

Anderson & Prichard No. 3 Harrison-Carlson, SE NW SE Section 22-25s-37e, top of the pay at 3,310 feet, total depth 3,377 feet, flowed 18 bbls. per hour for 25 hours through three-fourths inch choke, and 555,000 feet of gas per day.

Continental Oil Co. No. A-36 No. 1 State, C SW SW Section 36-20s-37e, topped pay at 3,750 feet, total depth 3,845 feet, but plugged back to 3,790 feet. It was shot with 400 quarts and flowed 11 bbls. per hour on a two-hour test, with gas at the rate of 396,000 feet per day.

Continental Oil Co. B-31 No. 1 Meyer, C NW SW Section 31-20s-38w, top of the pay at 3,720 feet, total depth 3,798 feet, flowed 108 bbls. in three hours through three-fourths inch choke, and gas at the rate of 822,000 feet per day.

Magnolia Petroleum Co. No. 2 Corrigan, C SE SE Section 33-21s-37e, top of the pay at 3,720 feet, total depth 3,760 feet, shot with 200 quarts, flowed 145 bbls. of oil through a half-inch choke.

Magnolia Petroleum Co. No. 15 State-Bridges, C SW SE Section 26-17s-34e, pay at 4,717-63 feet, flowed 132 bbls. in 4½ hours through open tubing.

Getty Oil Co. No. 3-F State, C NW NW Section 36-17s-34e, top of pay 4,647 feet, total depth 4,705 feet, flowed 42 bbls. per hour through open tubing.

In Eddy County, Paton Brothers No. 2 Ginsberg, C SE SE Section 8-18s-31, topped pay at 3,147 feet, total depth 3,185 feet and flowed 104 bbls. in 24 hours through casing. It was completed. Keyes and others No. 2 State, C SE NE Section 9-17s-28e, was shot with 40 quarts at 1,714-25 feet and is estimated good for 25 bbls. but was not yet completed.

Lea County

Anderson & Prichard No. 2 Stuart, SW SW NW Sec. 11-25-37. Drlg. 3,414 ft.
Anderson & Prichard No. 3 Wells, C NE NW Sec. 5-25-37. T.D. 3,567 ft.; 9,240,000 ft. of gas.
Cities Service No. 1-K State, C SW NE Sec. 27-17-35. Rng. csg. at 1,665 ft.
Continental Oil Co. No. 1 Hawk B-6, NW NW SE Sec. 6-21-37. Loc.
Continental Oil Co. No. 1-B-1 Lockhart, C SW NW Sec. 1-22-36. Drlg. 3,240 ft.
Continental Oil Co. No. 7 Reed B-23, NE NW SE Sec. 23-20-36. C.&P.
Continental Oil Co. No. 1 State 1-7, NE NW NE Sec. 7-17-34. Drlg. 4,873 ft.
Continental Oil Co. No. 2 State H-35, C NE NE Sec. 35-17-34. C.&P.
Continental Oil Co. No. 2-J-2 State, C NE SE Sec. 2-22-36. Drlg. 3,695 ft.
M. J. Delaney Drlg. Co. No. 1 State, C SE NW Sec. 30-17-35. Drlg. 741 ft.
Walter Donnelly No. 1 Davis, C SE NW Sec. 33-23-37. T.D. 3,600 ft.; S.S.O. at 3,578-84 ft.
Emperor Oil Co. No. 1 Humble-State, C SE SW Sec. 36-20-35. Drlg. 1,660 ft.
Great Western Prod. Co. No. 1 Leonard, C SE NE Sec. 32-23-37. T.D. 3,615 ft.; shot and F. 47 B.O.P.D.; tstg.
Gulf Oil Corp. No. 1 Alley, C NE SE Sec. 10-23-37. T.D. 3,715 ft.; P.B. 3,686 ft.; S.I.
Gulf Oil Corp. No. 2-D Arnott-Ramsey, C NE NE Sec. 33-21-36. C.&P.
Gulf Oil Corp. No. 6 McCormack, C NW SE Sec. 32-21-37. Drlg. 1,175 ft.
Helmerich & Payne and Continental Oil Co. No. 1-G-36 State, C NW SW Sec. 36-17-35. T.D. 4,920 ft.; S.O. and est. 1,000,000 ft. of gas.
Humble O. & R. Co. No. 6 Fopeano, C NE NE Sec. 35-20-36. T.D. 3,850 ft.; acdz. and swb.; est. 8 B.F.P.D.; tstg.
Humble O. & R. Co. No. 3 Greenwood, C SW SW Sec. 9-22-37. C.&P.
Humble O. & R. Co. No. 1-J State, C SW SW Sec. 19-17-35. Drlg. 3,523 ft.
Magnolia Pet. Co. No. 2 Hardy, NW NW NW Sec. 29-21-37. Loc.
Magnolia Pet. Co. No. 2-L State, C SW SW Sec. 21-17-35. Drlg. 3,382 ft.
Magnolia Pet. Co. No. 1-M State, C NE NW Sec. 34-17-35. Drlg.
Magnolia Pet. Co. No. 13 State-Bridges, C SW NW Sec. 25-17-34. T.D. 4,763 ft.; F. 110 B.O.P.D.
Magnolia Pet. Co. No. 14 State-Bridges, C SW NE Sec. 25-17-34. T.D. 4,720 ft.; swbg. and C.O.; caving.
Magnolia Pet. Co. No. 16 State-Bridges, C NW NE Sec. 25-17-34. R.U.R.
Magnolia Pet. Co. No. 17 State-Bridges, C NE NE Sec. 25-17-34. Loc.
Maljamar O. & G. Co. No. 10 Baish, C SW NW Sec. 22-17-32. T.D. 4,110 ft.; bailing 15 B.O.P.D. and tstg.
Maljamar O. & G. Co. No. 11 Baish, C NW NW Sec. 22-17-32. T.D. 4,104 ft.; 3,000 ft. O.I.H. in 18 hrs.; tstg.
Maljamar O. & G. Co. No. 12 Baish, C NE NW Sec. 22-17-32. Loc.
Maljamar O. & G. Co. No. 1-B State, C SW SE Sec. 16-17-32. T.D. 3,660 ft.; cmtg.
Jas. A. Mascho No. 2 Cloyd, C SW SW Sec. 20-22-33. Drlg. 4,950 ft.; blk. sdy. L.
John Menke No. 1 Alexander, C NW NW Sec. 5-21-37. T.D. 3,791 ft.; S.O.
Ohio Oil Co. No. 1 State-Warn, C NW NW Sec. 6-18-35. Drlg. 3,923 ft.
Ohio Oil Co. No. 1 State-Bridges, C NE NE Sec. 20-17-34. Drlg. 4,255 ft.
Ohio Oil Co. No. 1 Walden, C NE NE Sec. 21-22-37. O.W.D.D.; O.T.D. 3,636 ft.; T.D. 3,672 ft.; drlg. by D.P.
Ohio Oil Co. No. 1 Wills, C NE NW Sec. 35-26-37. R.U.R.
Olean Pet. Co. No. 1 Boyd, C NW SW Sec. 23-22-37. Drlg. 3,592 ft.; S.S.O.&G.
Olean Pet. Co. No. 1 Brunson, SW SE SE Sec. 4-22-37. C.&P.
Olean Pet. Co. No. 1 Ferrell, C NE SE Sec. 22-22-37. Drlg. plug 3,379 ft.
Parker Drlg. Co. No. 1-A State, C SW SW Sec. 21-22-37. Drlg. plug 3,381 ft.
Lem Peters No. 1 Coll, NW SW SW Sec. 26-22-37. T.D. 3,680 ft.; O.I.H.
Lem Peters No. 4 L. J. May, SW SE NE Sec. 27-22-37. Drlg. 2,575 ft.
Lem Peters No. 2 T. O. May, NW NE NE Sec. 34-22-37. T.D. 1,145 ft.; S.D.O.
Phillips Pet. Co. No. 3 Santa Fe, C SW NW Sec. 5-18-35. Drlg. 3,697 ft.
Phillips Pet. Co. No. 10 Santa Fe, C NE NW Sec. 24-17-34. M.I.M.
Phillips Pet. Co. No. 11 Santa Fe, C NE SW Sec. 26-17-35. Drlg. 1,275 ft.
Phillips & Pure No. 3 Woolworth, C E½ SE SE Sec. 33-24-37. Drlg. 3,240 ft.
Shasta Oil Co. No. 3 Woolworth, NE SE NW Sec. 28-24-37. Loc.
Shell Pet. Corp. No. 1-E State, C SE SW Sec. 31-17-35. W.O.C. 4,284 ft.
Shell Pet. Corp. No. 1-F State, C SW SW Sec. 29-17-35. W.O.C. 1,589 ft.
Shell Pet. Corp. No. 1-G State, C SE SE Sec. 22-17-34. T.D. 4,765 ft.; shot and prep. to swb.
Shell Pet. Corp. No. 1-H State, C NW SW Sec. 29-17-35. C.&P.
Shell Pet. Corp. No. 4-H State, W½ NE SE Sec. 13-21-35. T.D. 3,907 ft.; rng. tbg. to test.
Shell Pet. Corp. No. 1-I State, C SW NW Sec. 29-17-35. C.&P.
Shell Pet. Corp. No. 1-S State, C NE SE Sec. 21-17-35. Drlg. 2,410 ft.
Shell Pet. Corp. No. 1 Swigart, C NE SE Sec. 25-17-34. T.D. 4,700 ft.; acdz. and swb. and F. 181 B.O. in 12 hrs.
Shell Pet. Corp. No. 1-U State, C NE NW Sec. 3-18-35. Drlg.
Skelly Oil Co. No. 1 Baker, C SW SW Sec. 10-22-37. Drlg. 1,120 ft.
Skelly Oil Co. No. 6 Baker, C SW NE Sec. 27-22-37. Drlg. 3,636 ft.; 3,400 ft. O.I.H.
Skelly Oil Co. No. 1-B King, C NE SW Sec. 33-22-37. Drlg. 1,980 ft.
Skelly Oil Co. No. 1-M State, C SW SW Sec. 32-24-37. T.D. 3,418 ft.; drlg. plug.
Stanolind O. & G. Co. No. 5-B Langlie, C SE SE Sec. 9-25-37. Drlg. 3,271 ft.
Stanolind O. & G. No. 26 Thorpe, C SE NW Sec. 10-19-38. O.W.D.D.; O.T.D. 4,185 ft.; drlg. 4,188 ft.
Stanolind O. & G. Co. No. 8 Terry, C NW SE Sec. 9-19-38. O.W.D.D.; O.T.D. 4,186 ft.; T.D. 4,200 ft.; F. 5 B.O. head every 3 hrs.; tstg.
Standard Oil Co. of Texas No. 1 State, C SW NW Sec. 32-17-35. T.D. 4,705 ft.; waiting pump.
Standard of Texas No. 1 State Lease No. 4, C NE SW Sec. 27-17-35. Drlg. 1,621 ft.
Sou. Pet. Explo. No. 4 Downes, C NW SW Sec. 32-21-37. T.D. 3,780 ft.; to shoot.
Texas Co. No. 3 Black, C NW NE Sec. 21-24-37. T.D. 3,600 ft.; S.I.
Texas Co. No. 4 Black, C SE NW Sec. 21-24-37. C.&P.
Texas Co. No. 5 Fristoe, NW SE SE Sec. 3-25-37. Drlg. 2,915 ft.
Texas Co. No. 2 Fanning, C NW NE Sec. 4-26-37. Drlg. 3,020 ft.
Texas Co. No. 15 Lieu Lands, C SW NE Sec. 20-20-37. Drlg. 3,845 ft.
Texas Co. No. 1 Lodewick, C SW SE Sec. 34-18-33. Loc.
Texas Co. No. 1-N State, C SW SW Sec. 30-17-35. T.D. 4,850 ft.; P.B. 4,689 ft.
Texas Co. No. 3-Q State, C NW SE Sec. 25-17-34. T.D. 4,725 ft.; acdz.
Texas Co. No. 1-S State, C NW SW Sec. 35-17-34. Drlg. 4,375 ft.
Texas Co. No. 7-O State, C SE SE Sec. 36-17-34. Drlg. 3,770 ft.
Texas Co. No. 8-O State, C SW SW Sec. 36-17-34. Drlg. 3,285 ft.
Texas Pacific C. & O. Co. No. 6-A State, SW SE NW Sec. 21-23-26. Drlg. 700 ft.
Tide Water Asso. Oil Co. No. 1-L State, C NE NW Sec. 23-12-36. T.D. 5,294 ft.
Twin Oil Co. No. 1 Hare, C SE SW Sec. 33-21-37. T.D. 1,203 ft.; set 8⅝-in. csg.
Twin Oil Co. No. 1 Joyce-Pruitt, C SE SE Sec. 31-21-37. T.D. 3,771 ft.; rng. tbg. to test.
Twin Oil Co. No. 2 Corrigan, C NE NE Sec. 4-22-37. T.D. 3,743 ft.; F. 201 B.O. in 24 hrs.
Two States Oil Co. No. 3-B Cole, C SE NE Sec. 16-22-37. Drlg.
Two States Oil Co and Kaseman No. 2-A Hill, C SE SW Sec. 31-20-38. Drlg. 3,684 ft.
Weiner et al No. 2 Smith, NW SE NE Sec. 4-25-37. Drlg. 2,875 ft.
Sam Weiner No. 1 Woolworth, SE NE SW Sec. 33-24-37. R.U.R.
Francis C. Wilson No. 1 State, C SW NE Sec. 7-21-35. Drlg. 2,100 ft.

Eddy County

Adkinson Oil Co. No. 1 Brainard, SE SW SE Sec. 5-18-27. Loc.
F. E. Baker No. 1 Eddy, NE Sec. 12-22-27. T.D. 2,510 ft.; S.D.O.
Carper Drlg. Co. No. 1 Day, NE NE NE Sec. 3-19-21. T.D. 2,748 ft.; 400 ft. O.I.H. in 3 hrs.; tstg.
Carper Drlg. Co. No. 3 Robinson, SW SW SE Sec. 25-16-31. R.U.S.T.
B. Cockburn No. 1 State, C SW NE Sec. 16-18-31. Drlg. 1,020 ft.
Danciger O. & R. Co. No. 1-B Turner, CEL NE SE Sec. 17-17-31. Drlg. 1,700 ft.
D. & B. Oil Co. No. 3-A Berry, NW SW NW Sec. 21-17-30. Drlg. 2,820 ft.
Dominion O. & G. Co. No. 2 Johnson, C SE NE Sec. 35-16-31. T.D. 3,932 ft.; S.O.; shot and C.O.
Dominion O. & G. Co. No. 3 Johnson, C NE SW Sec. 35-16-31. T.D. 2,650 ft.; fsg.
English & Harmon No. 1 Dougherty, NE NE SW Sec. 3-17-27. T.D. 2,319 ft.; S.D.O.
Etz Bros. No. 5 State, SE NE SE Sec. 16-17-30. Drlg. 1,140 ft.
Franklin Pet. Corp. No. 1 McIntyre, NW NE SE Sec. 20-17-30. T.D. 2,748 ft.; fsg. bailer; 400 ft. O.I.H. in 1½ hrs.
Fullerton Oil Co. No. 1-A Johnson, C SE NW Sec. 35-16-31. T.D. 3,871 ft.; C.O. at 3,689 ft.
Fullerton Oil Co. No. 2-A Johnson, C NW SE Sec. 35-16-31. Drlg. 2,330 ft.
Fullerton Oil Co. No. 1-A Little, C NE NE Sec. 28-18-31. Drlg. 3,097 ft.

C. F. Ingram No. 1 Page, NE NE SW Sec. 15-21-28. T.D. 2,483 ft.; S.D.R.
F. G. Keys No. 2 State, C SE NE Sec. 9-17-28. T.D. 1,725 ft.; shot and C.O.
Harry Leonard No. 1 Texas, NW NW NE Sec. 36-16-31. T.D. 4,009 ft.; F. 75 B.O.P.D. while C.O.
Martin-Yates No. 1 Bowers, SW SE SE Sec. 31-19-27. Drlg. 460 ft. L.; O.I.H.
Paton Bros. No. 1 Erwin, C SW SW Sec. 9-18-31. Cellar.
Premier Pet. Co. No. 1 Maddren-Beeson, NE SW SE Sec. 28-17-30. Drlg. 2,100 ft.; S.S.O.
Repollo Oil Co. No. 3 Beeson, SE NE SE Sec. 28-17-30. Drlg. 3,218 ft.; 1,500 ft. O.I.H. in 3 hrs.
Western Drlg. Co. No. 2-A Western, SE SE NW Sec. 23-17-29. T.D. 3,040 ft.; est. F. 20 B.O.P.D.; still tstg.
Neil H. Wills No. 2 Colglazier, SW SW NE Sec. 20-20-30. Drlg. 1,369 ft.
Martin Yates, Jr., No. 1 Bowers, SW SE SE Sec. 31-19-27. Drlg. 640 ft.
Yates-Dooley No. 1 Creek, C SW NE Sec. 35-18-30. Drlg. 2,750 ft.

Chaves County

E. J. Fisher No. 1 Foster, C NW NW Sec. 7-15-26. T.D. 1,107 ft.; R.U. mch.
Nay Hightower No. 1 Billingslea, C SW NE Sec. 28-11-30. T.D. 20 ft.; R.U.S.T.
Interstate Minerals, Inc., No. 1 Dunigan, NW cor. Sec. 15-15-30. T.D. 2,485 ft.; S.D. for csg.
J. & L. Drlg. Co. No. 2 Hurd, SW Sec. 11-11-26. Drlg. 1,550 ft.

De Baca County

N. F. Woods No. 1 Jones, C NE SW Sec. 17-4n-20. T.D. 190 ft.; S.D.O.
James D. Ward No. 1 Summers, SE NE SW Sec. 15-4n-24e. T.D. 404 ft.; S.D. repairs.

NORTHWEST NEW MEXICO

Bernalillo County

Norins Realty Co., Inc., No. 2 Pajarito, Sec. 22-9n-1e. Drk.; M.I. rot.
Norins Realty Co., Inc., No. 2 North Albuquerque, NE SE NW Sec. 10-11n-4e. Drlg. 4,050 ft.

McKinley County

Petroleum Production Corp. No. 1 Santa Fe, NE NE NW Sec. 1-17n-9w. Drlg. 1,275 ft.

Rio Arriba County

The Axelind Oil Co. No. 1 Gonzales, on unsurveyed land, but approximately in the NE NW Section 4-32n-1e, a test on the southern end of the Chromo anticline, which extends over into Archuleta County, Colorado, tested two sand horizons in the Dakota series, both of which showed hot sulfur water, and was plugged and abandoned at 1,022 feet. Top of first sand was at 934 feet. The test had a few good shows of gas on the way down, but no oil shows. It is about 6 miles to the southwest of the Gramps pool, on the Colorado side.

Continental Oil Co.-L. M. Hughes No. 1 Esquibel, unsurveyed; approx. Sec. 28-28n-4e. T.D. 1,817 ft.; W. in Dakota at 1,800 ft.; will go to Wingate.
Oil City Pet. Co. No. 1 Azotea, SW SW NE Sec. 11-31n-2e. Drlg. below 300 ft.

San Juan County

The Continental Oil Co. No. 80 Rattlesnake, SW SW NW Section 1-29n-19w, Rattlesnake pool, tested 78 bbls. first 24 hours from the Dakota at 837 feet, total depth.

Continental Oil Co. No. 81 Rattlesnake, SW NW NW Sec. 1-29n-19w. R.U. (first report).
Jack Amenda No. 1, NE NE Sec. 14-29n-13w. Drlg. below 100 ft.
Al Greer No. 2 fee, SW SE SW Sec. 10-30-11w. S.D. 660 ft. for 10-in.
Anna Oil Corp. No. 6 Govt., SW NE NE Sec. 33-30n-11w. S.D. 1,893 ft.

Socorro County

Central New Mexico Oil Co. No. 1 Belen gr., SE NW Sec. 16-3n-1e. T.D. 2,965 ft. (C.D.); C.O.

Torrance County

Drice Co. No. 1 Garland, NE SE NE Sec. 32-7n-7e, T.D. 1,325 ft.; cmtg. dry caves at 1,150-1,280 ft.
Estancia Valley Carbon-Dioxide Dev. Co. No. 1 Crawford, SE NE NE Sec. 32-7n-7e. S.D. 1,010 ft.
Chief Oil & Gas Co. No. 1 Lee, NW NW SW Sec. 12-6n-7e. T.D. 2,215 ft.; C.O. 300 ft.

Valencia County

Old Spanish Grants, Inc., No. 1 San Clemente, C SE SW Sec. 23-7n-1e. Drk.; W.O. rotary.
C. A. Grober et al No. 1 Fuqua, NE NE Sec. 19-5n-3e. T.D. 840 ft. (C.D.) W.O. title adj.

COLORADO

Adams County

J. B. Furstenberg and others, formerly carried as the Glenridge Oil Corp., have resumed operations on No. 1 Hills in the Watkins district, in the Denver basin. Present depth is 4,345 feet. The crew is cleaning out and cementing off caves and expect to be making new hole this week.

J. B. Furstenberg et al No. 1 Hills, SE SE SE Sec. 27-3s-64w. T.D. 4,345 ft.; C.O. and cmtg. hole.

Archuleta County

Boone Dev. Co. No. 1 Newton, SE NW SE Sec. 18-33n-1e. T.D. 303 ft.; W.O. 10-in.
Pagosa Oil & Dev. Co. No. 1 Macht, C Sec. 32-36-1w. T.D. 1,840 ft.; rng. 6¼-in. with bttm. hole packer to top Dakota.

Elbert County

The Plymouth Oil Co.'s test in the Ramah district is drilling at around 5,000 feet. J. L. Tatum, chief geologist for the company, and two company officials are due to arrive at the well this week to watch developments.

Fremont County

Stanley Thomas No. 1 Rickwalt, SE SE Sec. 2-19s-70w. Drlg. 2,215 ft.
R. E. Hawks No. 1 Orndoff, NE SW NE Sec. 3-19s-70w. T.D. 1,650 ft.; C.O. to D.D.

Garfield County

Roaring Fork Oil Co. No. 1 Patterson, S NE Sec. 36-7s-88w. T.D. 1,502 ft.; ran 6⅝-in. to 1,420 ft.; U.R. at 1,430 ft.

Grand County

Interstate O. & R. Co. No. 1 Hinman, NE SE NW Sec. 11-2n-81w. S.D. 3,920 ft.; will D.D. to Morrison.

Huerfano County

J. G. Tomkins & Sons No. 1 Pressey, NW NE NE Section 10-29s-69w, near Oakview, caused considerable excitement when it blew in at 417 feet as a flowing well. It failed to hold up and at last reports oil was standing within 12 feet of the top and arrangements were being made for a pumping test. The show is believed to be in the Trinidad sandstone in the Laramie formation, approximately the same formation as the Milliken sand farther to the southeast. Identification is made from a sandstone in a nearby coal mine which shows saturation.

The showing was struck at 412 feet and continued to 417 feet where it went over the top, flowing by heads. It was estimated at 50 bbls. per day of fluid, of which about 10 per cent is water. Later estimates are that it will make around 20 bbls.

S. W. Pressey, on whose lease the well is located, gave the gravity as 48 degrees, the oil having a greenish-amber cast.

J. G. Tomkins & Sons No. 1 Pressey, NE NE NE Sec. 10-29s-69w. T.D. 417 ft.; prep. to test.
S. W. Pressey No. 2 Alamo, C SW SE Sec. 3-27s-68w. Drlg. 1,550 ft.

LaPlata County

N. Spatter No. 1-X Bryce, SE SW SW Sec. 31-33n-9w. Drlg. 1,726 ft. in red sh.

Las Animas County

The Garcia Corp. No. 1 McClung, NE NW SE Section 19-33s-61w, Garcia district, was plugged and abandoned at 2,500 feet in the Fountain arkose.

Mesa County

Continental Oil Co. et al No. 1 Miller, SW SW NW Sec. 36-8s-91w. Drlg. 7,554 ft. in silty sh. and streaks of sd.; top Mancos 3,980 ft.; Dakota expected at 8,400 ft.

Moffat County

Stanolind Oil & Gas Co. No. 5-SD Parkinsoen, CNL NW SE Sec. 22-4n-92w. Cmtd. 4½-in. liner at 3,464 ft.; W.O.C.

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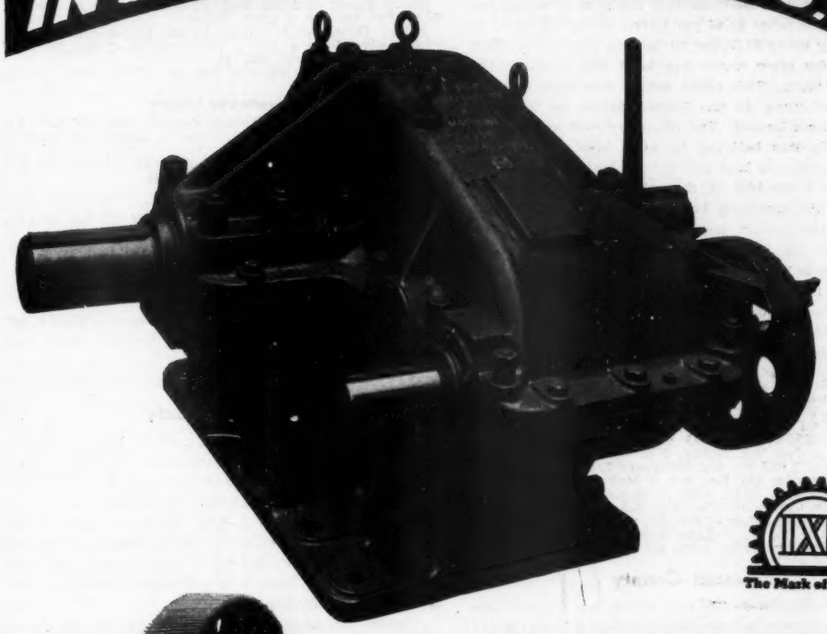

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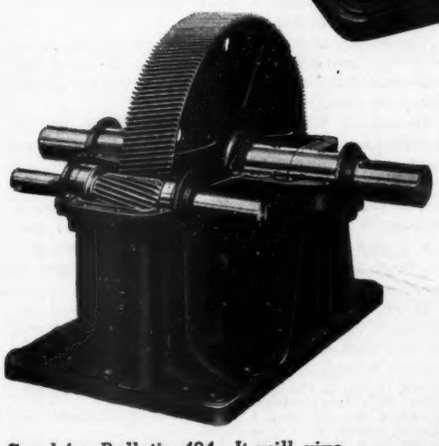

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Mackinnie Oil & Drlg. Co. No. 1 Coles, SW SW SE Sec. 1-3n-92w. Drlg. 2,810 ft. in Mowry sh. (formerly Morapas Pet. Corp.)
C. R. Privett No. 1 Sutton, NE NE SW Sec. 1-5n-96w. T.W. 590 (C.D.) ft.; U.R. 10-in. to S.O.W. above gas at 525 ft.

Montezuma County

McElmo Oil Co. No. 1 West, NE NW NW Sec. 31-36s-17w. S.D. 4,720 ft. for repairs.

Park County

South Park Oil Co. No. 1 Lemar, NE NE SE Sec. 34-11s-75w. Drlg. 6,158 ft.

Prowers County

Continental Oil Co. No. 1 Ruby, C NE NW Sec. 31-21s-44w. Drlg. 5,203 ft.; 9⅝-in. at 3,582 ft.

Pueblo County

Eden O. & G. Co. No. 1 Horse Creek, SW SE Sec. 29-19s-64w. Drlg. sh. 1,005 ft.
C. E. Puckett No. 1 Barber, NW Sec. 35-21s-66w. S.D. 860 ft. for csg.; flowing W. in Dakota.

Rio Blanco County

Buford Oil Co. No. 1 Govt., C SW SW Sec. 16-1n-91w. Drlg. 2,952 ft. blk. sh.

WYOMING

Big Horn County

A. L. Rankins No. 1 Karjajia-Rankin, C SW NW Sec. 10-54n-94w. T.D. 500 (C.D.) ft; tstg. heavy S.O.
Prescott & Mileski No. 1 Govt., NE NW SW Sec. 15-1n-93w. S.D. 832 (C.D.) ft. for csg.
Clifford S. Johnson No. 1 Johnson, CEL NW NW Sec. 24-51n-93w. Rig; W.O. engine.
Joan Oil Co. No. 1 Howell, NE NW NE Sec. 32-55n-97w. T.D. 2,420 ft.; fsg.
John H. Thomas No. 1 Govt., SW SW SE Sec. 3-54n-94w. Spdg. 50 ft. Spence dome (first report).

Campbell County

Frye & Kreiner No. 2, CSL NW NW Sec. 6-50n-72w. T.D. 723 ft.; rng. 5½-in. for W.S.O.

Carbon County

The Ohio Oil Co. posted a blanket increase of 2½ cents per barrel on Medicine Bow crude as of September 3, making the price $1.44 per barrel for crude of 55 to 55.9 gravity up to $1.52 for 60 degrees and above. This price applies after crude has been run through the stabilizing plant. This plant, which was built in 1936, was one of three in the United States at the time and the second largest. The discovery well at Medicine Bow, which was believed to have been the world's largest producer of high-gravity oil, had a rated initial capacity of 6,000 bbls. a day, the distillate produced from the first Sundance being 76 degrees A.P.I. scale, and from the second sand 66 degrees. All the crude produced in the field is charged to this plant where propane, iso-butane and a sufficient quantity of normal butane are removed to reduce the vapor pressure of the crude to 8½ pounds. That is considered the maximum pressure that can be handled and avoid vapor lock in gasoline made from such crude.

C. D. Cunningham et al No. 1 Union Pacific-Fee, NW SE NE Sec. 21-22n-78w. M.I.M.
C. D. Cunningham et al No. 1 Union Pacific-Wolfe, SE NW SW Sec. 7-23n-78w. Drlg. wh. L. 378 ft.
Ohio Oil Co.-California Co. No. 5-A Kyle, C NE NW Sec. 26-21n-97w. Rig; W.O. equip.
Ohio Oil Co. No. 2-A Baker, NW SW SW Sec. 2-23n-79w. Drlg. 2,093 ft.; top Morrison 2,060 ft.
Sinclair-Wyoming Oil Co. No. 3 Mahoney, C SE NW Sec. 34-26n-88w. Drlg. 4,205 ft. in Embar.
Ohio Oil Co.-California Co. No. 3-A Kyle, C SW NE Sec. 26-21n-79w. Drlg. 7,607 ft.; will go to granite.
Producers Oil Co. No. 1 Lake Valley, 200 ft. C of CNL Sec. 14-20n-88w. Drlg. 1,916 ft.

Fremont County

The Lincoln Oil & Gas Co., which was formed this summer by a group of men who purchased Tribal leases on 400 acres in the old Plunkett field last March, completed its first well in its No. 1 Tribal, NW NW SE Section 23-1s-1e, for 15 bbls. per day at 480 feet. The oil is green of about 40 gravity. Plunkett was one of the early Wyoming oil developments. Location has been made for another well.

Lincoln Oil & Gas Co. No. 26 Tribal, NE SE SW Sec. 23-1s-1e. Spdg. 93 ft. (first report).
Tropic Oil Co. No. 1 Govt., C SE SW Sec. 34-27n-90w. Drlg. 3,425 ft.; S.O. in Dakota not coml.; will go to Lakota.
Consolidated Oil Properties No. 3 Ewart, C SW SE Sec. 16-1n-1w. Drlg. 1,150 ft.
Ben Stewart No. 1 Darnell, NE SE Sec. 26-3n-1w. S.D. 2,245 ft. for 7-in.
C. E. Nelson No. 8 fee, CWL NE SW Sec. 27-3n-1w. Drlg. 695 ft.

Hot Springs County

D. D. Gibson No. 22 fee, NE NW SW Section 35-43n-94w, in the Warm Springs black oil field, was deepened from 916 feet, in the Embar to 1,009 feet and recompleted for 50 bbls. per day.

Italo Pet. Co. No. 1 Skelton-Govt., SE SW NE Sec. 13-44n-98w. Drlg. 1,073 ft.
J. W. Bailes No. 1 Govt., SE SW Sec. 28-43n-93w. T.D. 1,082 ft.; P.B. to 1,015 ft.; tstg.

Lincoln County

H. C. Harris et al No. 1 Govt., SE NW NW Sec. 23-21n-117w. Drlg. 960 ft.

Natrona County

General Pet. Corp. No. 1 State, NW NE SE Sec. 16-35n-77w. Drlg. 3,678 ft. in steel sh.
Stanolind O. & G. Co. No. 8 T.P.-Midwest Oil, C NW SW Sec. 35-40n-79w. Drlg. 3,095 ft. r.b.

Niobrara County

The Continental Oil Co. No. 3 Apex-3, Lance Creek, reported a completion last week, flowed 520 bbls. first 24 hours, 504 bbls. second period. It may be acidized.

The MacKinnie Oil & Drilling Co. made a location for No. 4 Thompson, a west offset to Continental Oil Co. No. 3 Dielman, a drilling wildcat at the southern end of the field.

MacKinnie Oil & Drlg. Co. No. 4 Thompson, SE SW NE Sec. 7-35n-65w. Loc. (first report).
Continental Oil Co. No. 1-B Dielman, SW SE NE Sec. 7-35n-65w. Drlg. sh. 310 ft.
Continental Oil Co. No. 13 Tom Bell, SE NE SE Sec. 33-36n-65w. Loc.
Ohio Oil Co. No. 11 Lamb Acct. 2, SW SE SE Sec. 5-35n-65w. Drlg. 3,460 ft.
Fall River Royalty & Producers Co. No. 1 Govt., CSL SE SE Sec. 35-40n-61w. Drlg. 345 ft.
Continental Oil Co. No. 7-B Schuricht, NW NW SE Sec. 6-35n-65w. Loc.
H. D. Moore et al No. 1 Beregren, NW Sec. 23-35n-63w. Drlg. r.b. 1,523 ft.
Adams Oil & Gas Co. No. 1 Baker, NE NE SW Sec. 8-35n-65w. Tent. loc.

Park County

Ohio Oil Co. No. 1 Trans-Ark., CSL SW SW Sec. 30-57n-98w. Drlg. r.b. 6,687 ft.
Valentine & Watson No. 1 Johnson, NE NE NE Sec. 6-57n-99w. S.D.O. 2,490 ft.
Resolute Oil Co. No. 2 State, C SW SW Sec. 16-57n-101w. Drlg. 7,210 ft.
Continental Oil Co. No. 1 Northern Pacific, SE SE NW Sec. 23-58n-98w. T.D. 3,530 ft.; cmtd. 7-in. 3,442 ft.; swbg. and tstg. good sat. 3,464-3,530 ft.; heavy sat. 3,522 ft. to bttm.

Platte County

Bill Griffin et al No. 1, NE SE NE Sec. 18-30n-67w. Spdg. 50 ft.

Sublette County

Frontier Pet. Co. No. 1 Govt., SE SE SW Sec. 1-28-114w. T.D. 3,879 ft.; cmtd. 10-in. 160 ft.; W.O.C.
Yellowstone Oil Co No. 1, 200 ft. N of S line of the H. L. Budd ranch, SE SE Sec. 31-31n-112w. S.D. 100 ft.
Wyo. Pet. Co. No. 1 Chas. Budd, C NE NE Sec. 10-29n-113w. Drlg. 748 ft.; prep. install Diesel power.
Progressive Oil Co. No. 1 Haddenham, C NE SE Sec. 21-28n-113w. Drlg. 832 ft.
Texas Co. No. 3-G, NE NW SW Sec. 27-27n-113w. Drlg. 458 ft.

Sweetwater County

Selegna Oil Co. No. 1 Union Pacific, SW SW Sec. 11-20n-104w. Drlg. 5,100 ft.; D.S. tst. 5,001-76 ft. yielded only W.
Sinclair-Wyoming Oil Co. No. 79 Lost Soldier, SE NE NE Sec. 10-26n-90w. Drlg. 1,301 ft.

Uinta County

Stove Creek Oil Co. No. 1 Govt., NE SW NE Sec. 26-14n-119w. Cmtd. 10-in. at 1,420 ft.
Stove Creek Oil Co. No. 2 Govt., C SW NW Sec. 26-14n-119w. S.D. 300 ft.

Washakie County

The Fison Oil Co. No. 1 Government, CSL NE SE Section 24-47n-90w, a test on the Sherard dome, was dry and abandoned at 176 feet.

Paul Boether No. 1 Govt., SW NW Sec. 4-47n-90w. Drlg. 669 ft.

Weston County

The Des Moines-Osage Oil Co. (F. G. Dilger, trustee) No. 15, SW SW SE Section 30-46n-63w, reported a completion two weeks ago for 10 bbls. per day naturally, made 50 bbls. per day when shot and cleaned out.

George Keisling No. 1, NW NE NE Section 35-46n-64w, which marks an extension of the Osage proven area half a mile on the southwest, swabbed 4 bbls. per hour until storage was filled. It is waiting on the completion of 1,500 bbls. additional storage.

Updike Brothers No. 1, NE SW NE Section 35, a little more than one-fourth of a mile to the southwest of the Keisling well, is running 160 feet lower on the Greenhorn lime.

Howland & Seneker No. 3, NE SW NE Section 13-46n-64w, had the pay at 1,403-14 feet, but has not been tested. It looks like a 3-bbl. well.

Bock & Jackson No. 2, CNL NW NW Section 31-46n-63w, at the north end of the field, is showing for a producer in the Coffee Grounds sand at 176-228 feet. It is a west offset to the same firm's No. 1, which a few weeks ago was completed for 96 bbls. initially in the same horizon.

Osage Production in August was 24,300 bbls. In addition to this, Dewey and Pedro are producing about 500 bbls. each month. Refiners took 24,500 bbls. from field and storage in August.

Taylor, Dodge & Pauley No. 2, SE SE NW Sec. 17-46n-63w. S.D. 100 ft., repairs.
Sackett & Butcher No. 1, C NE NW Sec. 23-46n-64w. Cmtd. 8¼-in. thru Greenhorn.
Updike Bros. No. 1, NE SW NE Sec. 35-46n-64w. Cmtd. 8¼-in 1,200 ft.; tstg. W.S.O.
Hugh Updike No. 1, CEL NW SE Sec. 15-46n-64w. Cmtd. 8¼-in. thru Greenhorn.

MONTANA

Big Horn County

Buzetti & Corkins No. 1, NE NW Sec. 23-1s-32e. M.I.M.

Blaine County

R. E. O'Keefe No. 1 Tetter, CSL SW SE Sec. 10-31n-18e. Loc. Tiger Butte dist. (first report).
Montana Gas Corp. No. 1 Duncan, C NW SE Sec. 6-32n-24e. Drlg. below 250 ft.

Fergus County

Baughman & Singley No. 1 Skaggs, C NW SW Sec. 7-15n-20e. Drlg. 1,200 ft.

Glacier County

Cut Bank had one completion and one new operation. The Santa Rita Oil & Gas Co. No. 1 Government, SE cor. SW Section 5-32n-5w, southern part of the field, swabbed 75 bbls. first 24 hours, after swabbing off head, from the Cut Bank at 2,930-64 feet, hole stopping while still in sand.

Glacier Prod. Co. No. 1 State Unit, 800 ft. W of C Sec. 16-34n-5w. R.U. (first report).
Texas Co. No. 1 Bonnet, NW SE SE Sec. 8-32n-5w. Drlg. plug 620 ft.
Glacier Prod. Co. No. 1 Math Unit, SW NE SW Sec. 36-35n-5w. Spdg. 250 ft.
Texas Co. No. 2 Govt., NE NW NE Sec. 17-32n-5w. Drlg. 890 ft.; Colo. 470 ft.; 10¾-in. cmtd. 503 ft.
Par Oil Co. No. 1 Tribal-170, SW NW SW Sec. 7-32n-5w. Drlg. 1,450 ft.
K. D. Pardee No. 1 Tribal-179, SE NW SE Sec. 12-32n-6w. Drlg. 2,635 ft.
Lawler No. 3 Hoerr-Harlan, NE SW SW Sec. 5-33n-5w. Drlg. 2,690 ft.
Santa Rita O. & G. Co. No. 3 Lander, C S½ SE Sec. 16-35n-6w. Loc.
Nadeau Bros. No. 5 Farmers State Bank, CEL SE NE Sec. 17-33-5w. Drlg. 2,848 ft.

Phillips County

Treasure State Pool O. & G. Co. No. 1 Govt., C SE SW Sec. 2-24n-23e. Lost hole at 560 ft.; skdg. rig.

Richland County

W. M. Fulton No. 1 Richardson, SW SW SE Sec. 29-26n-52e. Drlg. 500 ft.; Poplar dome (first report).

Teton County

California Co. No. 1 Unit, NE SE SW Sec. 26-27n-9w. Drlg. hd. L. 973 ft.
Gulf State Oil-Zodiac Oil Co. No. 1 Coffee-Wallenstein, SW SW SW Sec. 5-27n-5w. T.D. 2,525 (C.D.) ft.; fsg.

Toole County

Kevin-Sunburst had four completions and one new operation.

V. F. Dahl No. 1 Kimball, SW SE SE Section 1-35n-3w, is reported making 5 to 6 bbls. per day from breaks in the Madison at 1,807 feet, total depth. It had the contact at 1,747 feet, with a break in the lime at 1,786 feet. It is showing a little water.

Pfabe & Engelking No. 2 Hurley, NE NE NW Section 8-34n-2w, was plugged and abandoned at 1,456 feet. It had a show of oil with water, but failed to take the acid.

Kluth and others No. 1 Gunderson, SE SW SW Section 18-35n-2w, is pumping 5 bbls. per day from the Ellis at 1,640-43 feet, after acidizing. Total depth 1,653 feet.

R. G. Parrant No. 1 Engstrom, NW cor. Section 13-35n-3w, is pumping 15 bbls. per day from breaks in the lime at 1,743-48 feet and 1,750-59 feet. It was dry at the contact at 1,751 feet.

J. W. Perron No. 2 Hugi, C SE NW Sec. 11-35n-3w. Drlg. 1,250 ft. (first report).
Lewistown-Flathead Oil Co. No. 1 Bashoe, SE SE SE Sec. 9-35n-1w. Drlg. 1,275 ft.
Consolidated Gas Co. No. 1 Haukland, C SW NW Sec. 27-33n-2w. Drlg. 970 ft.
A. Beardslee No. 9 Swears, CSL SW NW Sec. 9-35n-2w. Drlg. 1,550 ft.; S.O. 1,440-60 ft. in Sunburst.
Big West Oil Co. No. 3 Engle, CSL SW SW Sec. 1-35n-3w. T.D. 1,625 ft.; prep. rn. csg.; Sunburst 1,598-1,625 ft.
C. D. Stock No. 3 Haggerty, SE NW SW Sec. 13-35n-2w. S.D. 1,580 ft. until spring.
W. M. Cassidy No. 1 Phoenix, CNL NW NW Sec. 28-35n-4w. Drlg. 1,850 ft.

Yellowstone County

The Wyomont Oil Co. (Paul Boether and others) of Lodi, Calif., have taken over the R. C. Tarrant operation on Mosser dome and is drilling its first well, No. 1 Boetcher-Sayre, a northwest offset to a producer and a southwest offset to a dry hole.

The Signal Oil & Gas Co. has taken over the Broadview Dome Oil Co.'s test on Broadview dome and is preparing to deepen it from 4,561 feet, in the Madison lime, to test the Devonian.

Wyomont Oil Co. No. 1 Boetcher-Sayre, C NE SW Sec. 26-3s-24e. Drlg. 955 ft. on top of Dakota.
Signal Oil & Gas Co. No. 1 Stallinberger, NE NE SW Sec. 18-3n-23e. T.D. 4,561 ft.; prep. to D.D.
Riverton Oil Co. No. 1 Fox, CEL NW NE Sec. 14-2n-23e. T.D. 1,795 ft.; landed 8¼-in. at 1,510 ft.

UTAH

Grand County

Cane Creek Oil Co. No. 1 Govt., NW SW Sec. 31-26n-21e. Drlg. 1,710 ft. br. sh.; S.G.
Crescent Eagle Oil Co. No. 1 Brendel, SW SE Sec. 4-22s-19e. Drlg. 4,010 ft.
Columbia Crude Corp. No. 1 Rath, NW SW SE Sec. 12-25s-20e. T.D. 3,992 ft.; trying to S.O.W. to D.D.

Summit County

Longwell Pet. Co. No. 1, SE SW SE Sec. 35-3n-5e. T.D. 2,876 ft.; sdtrkg.

NEBRASKA

Sioux County

Union Oil Co. of Calif. No. 1 Agate-15, NW SE SE Sec. 15-28-55w. Drlg. below 5,300 ft. in new hole.

Oklahoma Operations

By DAL DALRYMPLE

Complete 3,500-Barrel Well in Coal County, Jesse District

A deep producer was completed in the oolitic lime zone of the Fox field, Carter County; a 3,512-bbl. well was completed in the Coal County extension of the Jesse pool, and a 1,104-bbl. well was completed in the recently opened Southeast Braman pool in Kay County to feature the past week's operations in Oklahoma oil fields.

Both completions and first reports of the past week exceeded the totals for the previous week. The new work included wildcats in Kay, Muskogee, Seminole and Stephens counties. Three new operations also were listed in the Panhandle gas area of Texas County.

It was reported that a 3,000-foot test was to be drilled on a large block of acreage in Pittsburgh and Latimer counties, southeastern Oklahoma, but exact location was not announced. A group of Texas operators has been given contract to drill a wildcat on a block in Township 3n-17e, Pittsburg County, and Township 4n-18e, Latimer County, it was announced at McAlester. Location was expected to be staked and work start in the near future.

Wildcat Activity

Burke-Greis Oil Co. No. 1 Goodman, NE NE SW Section 20-14-7, wildcat in Creek County, found Wilcox sand at 4,236-42 feet, total depth, the hole filled with water and it was abandoned.

Anderson-Prichard Oil Corp. No. 1 School Land, SE cor. Section 14-6-17w, Kiowa County wildcat, topped Hunton lime at 520 feet, Sylvan shale 941 feet, Viola lime 1,025 feet, Wilcox sand 2,013 feet, water intruded and it was abandoned at 2,196 feet, total depth, in lime.

E. W. Hamilton No. 1 Riddle, NW cor. section 3-26-4e, wildcat near Kaw City in eastern Kay County, was digging cellar and pits. Location is on an Indian Territory Illuminating Oil Co. farmout. It was to be a 3,150-foot test.

Atlantic Refining Co. No. 1-A Watson, SE SE NW Section 28-28-1w, was location for a wildcat south of the Braman area, Kay County.

Claude W. Garrett No. 1 Fuel, SW cor. Section 22-14-18, wildcat south of Muskogee in Muskogee County, had spudded.

J. F. Smith No. 1 Wolfe, NE NE SW Section 36-7-5, west of the Dora pool in Seminole County, was a wildcat location.

M. J. Mitchell and others No. 1 Westfall, SE cor. Section 33-2n-4w, wildcat near Doyle, Stephens County, was scheduled to test Wilcox sand, with contract depth of 4,500 feet.

Lincoln County

Wilcox Oil & Gas Co. completed three producers and one dry hole on its block of acreage in the Sac and Fox pool, Lincoln County. The No. 7 De Lozier, SW NE NW Section 15-14-6, found Prue sand at 2,930 feet, total depth 3,039 feet, was shot and flowed 60 bbls. of oil and 1,000,000 feet of gas in 24 hours.

The company's No. 9 De Lozier, SE NE NW Section 15-14-6, flowed 60 bbls. of 47-gravity oil after a shot. Gas gauged 1,500,000 feet. It had Prue sand at 2,914-3,015 feet, total depth 3,018 feet.

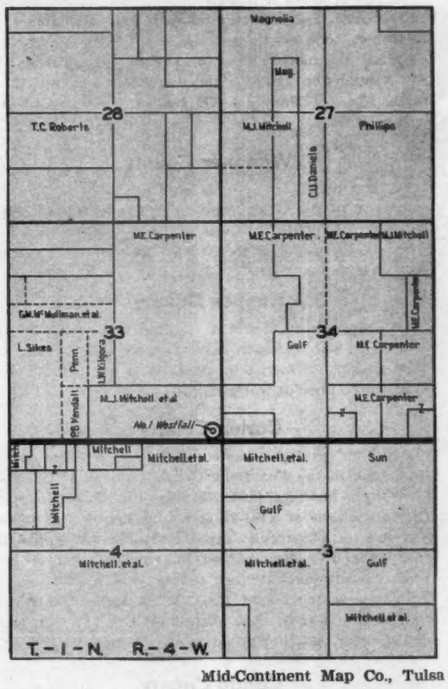
The No. 10 De Lozier, NE SW SW Section 10-14-6, found Prue sand at 2,961-3,056 feet, total depth, was shot and flowed 75 bbls. of oil in 24 hours, accompanied by 1,000,000 feet of gas.

Same company's No. 1 Terry A, NE SW SE Section 9-14-6, had a hole full of water in Prue sand at 3,147-85 feet, total depth, and was abandoned.

Another Sac and Fox producer was completed at Mudge Oil Co. No. 2 Wray, NW NW SE Section 10-14-6. It was shot and flowed 40 bbls. of oil daily, with 1,000,000 feet of gas, from Prue sand at 2,952-3,010 feet.

A gas well was completed in the Laffoon area at Sinclair Prairie Oil Co. No. 1 Rigney, SW cor. Section 3-13-6. It was an old well originally bottomed at 4,253 feet and plugged back to 4,080 feet. After ripping casing in Hunton lime at 4,030-72 feet and acidizing, it produced 23,000,000 feet of gas.

New work in Lincoln County: Wilcox Oil & Gas Co. No. 17 Sac and Fox, NE SE SW Section 15-14-6, spudded; same company's No. 5 Fitch, SW NE NE Section 15-14-6, drilling below 1,349 feet; Wilcox Oil & Gas Co. No. 11 De Lozier, NW NE NW Section 15-14-6, rigging up rotary; the company's No. 12 De Lozier, NE NW NW Section 15-14-6, location, and No. 13 De Lozier, SE SW SW Section 10-14-6, cellar and pits; Hubbel & McCann No. 1-A Teeter, SE SW NE Section 9-14-6, rig.



Mid-Continent Map Co., Tulsa

Wilcox sand was due to be tested at Mitchell and others wildcat in Section 33-2n-4w, Stephens County

Pottawatomie County

The week's completions in the St. Louis field, Pottawatomie County, included two new producers and a failure. Alma Oil Co. No. 1 East Curley, SW SE NW Section 33-7-5, had dolomite pay at 4,092-4,104 feet, total depth, and pumped 200 bbls. of 40-gravity oil and 195 bbls. of water in the first 24 hours.

Phillips Petroleum Co. No. 2 Le Clair, SE NW NE Section 23-7-4, found Calvin sand pay at 3,137-53 feet, was bottomed at 3,155 feet, and flowed 109 bbls. of 42-gravity oil in the first 24 hours.

Magnolia Petroleum Co. No. 3 Latimer, NE SW NW Section 17-7-4, topped Wilcox sand at 4,230 feet, had second sand at 4,250-61 feet, sulfur water intruded, it was plugged back to 3,700 feet, perforated casing and shot, but was dry and abandoned.

Magnolia Petroleum Co. No. 3 Davis, NW NE NE section 15-7-4, an old St. Louis well, was dry and abandoned after plugging back from 4,157 feet to 3,675 feet and shooting.

Alma Oil Co. No. 3 Curley, NW SW NW Section 33-7-5, an old well, was deepened from 4,041 feet to 4,075 feet and pumped 225 bbls. of 40-gravity oil and 225 bbls. of water in 24 hours.

First reports of new activity in Pottawatomie County: Denver Producing & Refining Co. No. 1 Hillerman, NW NW SW Section 1-6-4, building rig; same company's No. 1 Hurford, C N half N half SE Section 2-6-4, cellar and pits; Joe McCrabb No. 1 Smith, NW NW SW Section 2-7-4, cellar and pits; Trigg Drilling Co. No. 4 Vanselous, SW NE SE Section 32-7-5, drilling below 750 feet; same company's No. 1 Rhodd, NE NW SE Section 32-7-5, building rig; Alma Oil Co. No. 1 Rhodd, SE NE SW Section 32-7-5, drilling below 1,985 feet.

Estimated Daily Production

Estimated daily production for Oklahoma for the week ending September 17, and for the preceding week, was as follows:

	Barrels	
	Sept. 17	Sept. 10
Allen	5,650	5,775
Billings	4,700	4,600
Burbank	8,475	8,250
South Burbank	10,550	10,700
Balance Osage	18,750	18,650
Blackwell district	4,525	4,500
Bristow-Slick	6,900	6,925
Chandler	1,850	1,875
Crescent	4,025	4,225
Cromwell	3,450	3,450
Cushing-Shamrock	11,025	10,750
Duncan district	3,950	3,875
Edmond	5,025	4,650
Fish	2,750	2,775
Fitts	38,300	38,850
Jesse	2,025	2,675
Graham-Fox	4,125	4,025
Gray	925	900
Healdton	9,250	8,125
Hewitt	3,500	3,450
Keokuk	4,275	4,225
Konawa	1,250	1,275
Lucien	8,775	9,250
Moore	4,650	4,575
Oklahoma City	105,250	107,125
Olympic	4,775	4,850
Ramsey	2,100	2,150
Sasakwa	1,275	1,300
Sholem-Alechem	2,650	2,600
Seminole district:		
Bowlegs	7,625	7,650
Carr City	2,925	2,950
Dora	4,425	4,375
Earlsboro	4,550	4,575
South Earlsboro	400	400
East Earlsboro	4,425	4,400
Little River	6,350	6,325
East Little River	900	925
Maud	625	600
Mission	1,325	1,350
Seminole	6,850	6,875
East Seminole	1,600	1,625
Searight	2,525	2,475
Total Seminole	44,525	44,525
St. Louis-Pearson	19,300	19,250
Tatums	2,775	2,550
Tonkawa-Garber-Thomas	4,625	4,650
Wewoka	2,100	2,125
Yale-Jennings	4,000	4,025
Other pools	84,700	84,000
Total Oklahoma	446,775	447,500

Seminole County

Gilcrease Oil & Gas Co. No. 3 East Reed, NE NW NE Section 18-5-8, Allen district, had Hunton lime at 3,755-3,904 feet, total depth, acidized and flowed 536 bbls. of oil net in 24 hours. It later flowed 290 bbls. of oil daily.

Wood Oil Co. No. 1 Payne, SW SE NE Section 2-8-6, had Wilcox sand pay at 4,131-51 feet, total depth 4,154 feet in sand, and pumped 215 bbls. of 41-gravity oil the first 24 hours and 338 bbls. the next 24 hours.

Rogers & Rogers No. 1 Fisher, SW SW Section 25-7-5, Hazel pool, found Earlsboro sand pay at 2,940-62 feet, total depth, was shot and flowed 235 bbls. of oil through tubing in 24 hours. Gravity of the oil was 40 degrees.

Stanolind Oil & Gas Co. No. 1 Cosar, SE cor. Section 26 7-5, was dry and abandoned at 2,995 feet, total depth.

W. A. Villines No. 1-A Fisher, SW cor. Section 25-

7-5, Hazel area, was dry and abandoned at 2,970 feet, total depth.

Pontotoc County

Senora Oil & Gas Co. No. 1 Cox, NW cor. Section 17-5-5, Bebee pool, Pontotoc County, entered Viola lime at 2,382 feet, was bottomed at 2,491 feet, was acidized and pumped 240 bbls. of 39-gravity oil daily on seven-day average. Viola pay was found at 2,395-2,491 feet.

Osborn & Minton No. 1 King A, SE SW SE Section 32-5-8, Allen area, failed to find sand and was dry and abandoned at 2,693 feet, total depth.

Phillips Petroleum Co. No. 13 Norris, SE NW SW Section 25-2n-6, an old well in the Fitts field, was deepened from 4,282 feet to McLish formation at 4,340-70 feet, Dense 4,374-76 feet, total depth, and flowed 152 bbls. of 39-gravity oil daily.

C. E. Davis No. 1-D King, NE NE SE Section 32-5-8, was rigging up machine for a test in the Allen field.

Coal County

Continental Oil Co. completed a large producer in the Coal County extension of the Jesse field. Its No. 1 Brown, NW SW SW Section 7-1n-8, had basal McLish formation at 4,569-4,624 feet, total depth, and flowed 915.26 bbls. of oil in six hours, making potential of 3,512 bbls. Gas measured 1,600,000 feet daily.

Noble County

Two producers were completed in the North Lucien pool, Noble County. Shell Petroleum Corp. and others No. 2 Guthrie, SE SE SW Section 31-21-2w, topped Wilcox sand at 5,405 feet, was bottomed at 5,454 feet, flowed 305 bbls. of oil in six hours and made potential of 1,072 bbls., with 1,308,000 feet of gas.

Sinclair Prairie Oil Co. No. 2 Guthrie, NW SW SE Section 31-21-2w, flowed 271 bbls. of oil in six hours and was rated potentially at 840 bbls., with 732,000 feet of gas. It had first Wilcox sand at 5,375-5,422 feet, total depth 5,426 feet.

Osage County

Sinclair Prairie Oil Co. No. 10 Osage, NE SE Section 9-25-6, west side of the South Burbank pool, Osage County, found Bartlesville sand at 2,735 feet and was bottomed at 2,780 feet. It flowed 122 bbls. of oil in six hours and was rated potentially at 547.68 bbls. daily. Gas gauged 5,000,000 feet.

Ida Rabinovitz No. 3-A Osage, NW NW Section 22-22-9, entered Bartlesville sand at 2,092 feet, total depth 2,133 feet, and pumped 8 bbls. of oil and 15 bbls. of water in 24 hours.

Kay County

Tide Water Associated Oil Co. No. 1 School Land, SE SW SW Section 16-28-1w, Braman district, Kay County, topped first Wilcox sand at 3,523 feet, had second Wilcox sand at 3,596 feet and was bottomed at 3,632 feet. It flowed 37 bbls. of oil through tubing in the first 30 minutes, 75 bbls. of oil through casing in the next 30 minutes, and was completed for estimated potential of 1,104 bbls. of oil through tubing.

Pawnee County

Sinclair Prairie Oil Co. No. 6 Berger B, NE NE SE Section 17-21-8, an old Pawnee County well, was deepened from 1,843 feet to Skinner sand at 2,161-74 feet, total depth 2,176 feet, and pumped 44 bbls. of oil daily.

M. P. Thomas and others No. 3 Zackafoose, NW NE NE Section 23-20-9, had Layton sand at 1,198 feet, total depth 1,257 feet, plugged back to 1,250 feet, shot, swabbed 70 bbls. of oil in 12 hours and was testing.

Creek County

Kemp & Gibson No. 1 Sellers, SW NW SW Section 30-17-7, Creek County, had Layton sand at 1,653-70 feet, total depth, and was completed for an estimated 21,000,000 feet of gas.

Pepis & Alexander No. 1 Hughes, SE SW SW Section 15-18-10, topped Mississippi lime at 2,498 feet and was dry and abandoned at 2,727 feet in lime.

Gled Oil Co. No. 7 Escoe, NW SE SE Section 27-18-8, an old well, was recompleted as a 50-bbl. pumper after a shot in Red Fork sand at 2,605-36 feet, total depth. Nabob Oil Co. No. 1 Bowden, NE NW NE Section 9-17-8, an old well deepened from 1,462 feet, had a hole full of water in Bartlesville sand at 2,852-2,906 feet, and was abandoned. Utilities Production Corp. No. 2 Thomas, C E half SE SE Section 19-19-8, an old well, was deepened from 2,500 feet to Bartlesville sand at 2,730 feet, total depth 2,734 feet, water intruded and it was abandoned.

New work in Creek County: Strozier Drilling Co. No. 3 Gidden, NW NW SE Section 12-16-11, drilling below 700 feet; Wood Oil Co. No. 2 Gabriel, NE NW SW Section 24-19-7, drilling below 700 feet; Hilderbrandt & Hass No. 1-A Schumaker, SW NE SW Section 24-19-7, digging cellar and pits; J. M. Scott and others No. 1-A Warnock, NW SW NW Section 26-17-7, rig.

Okmulgee County

Commercial Drilling Co. No. 2 Parks, NE Section 35-15-12, Okmulgee County, topped pay at 1,579 feet, total depth 1,601 feet, and pumped 10 bbls. of oil daily.

R. L. Hollifield No. 1-A Whitten, NE cor. Section 9-13-14, was dry and abandoned at 1,253 feet, total depth.

New activity in Okmulgee County: Browning & Petter No. 1-A Kennedy, SW SE SW Section 10-13-13, machine; R. B. Pugh No. 17 Hulsey, CNL NE NW Section 23-13-14, an old well, deepening below 612 feet; W. W. Wilson No. 1-A Schacht, C S half SE SW Section 22-14-14, drilling below 160 feet; Sheridan Oil Co. No. 2 Thompson, SE SW SE Section 5-15-11, rig; J. P. Bradley No. 3-B Parks, C SE NE Section 9-15-11, drilling below 1,000 feet; Steckol Pipe & Supply Co. No. 4 Flynn, NE SE NE Section 23-16-12, location.

Okfuskee County

C. A. Sivils No. 3 Robinson, NW NW SE Section 21-12-11, Okfuskee County, was dry and abandoned at 2,845 feet, total depth.

Mead Production Co. No. 1 Pine and others, SW SW NW Section 14-12-11, had dug cellar and pits. C. A. Sivils No. 2-A Hall, SE NE NE SE Section 21-12-11, was a location.

Wagoner County

T. O. Cremin, Jr., No. 1 McIntosh, C NW SW Section 17-16-18, Wagoner County, had Tyner sand at 1,046-49 feet, total depth, and was dry and abandoned.

A. B. Chain No. 5 fee, C NW NW Section 16-16-15, was a rig.

Hughes County

Wasson Oil Co. No. 1-A Bulling, C E half SE NW Section 35-8-8, Jefferson pool, Hughes County, had oil sand at 2,020-32 feet, total depth, and pumped 25 bbls. of oil and 5 bbls. of water daily.

Carter County

Another producer was completed in the deep oolitic lime zone in the Fox field, Carter County, at Gulf Oil Corp. No. 2 McClure, C SE NE Section 28-2s-3w. It found the oolitic zone at 8,141-75 feet, total depth, and flowed 843 bbls. of 40.8-gravity oil and 237 bbls. of water the first 14 hours, accompanied by 1,299,000 feet of gas. Flow was through 2½-inch tubing.

Magnolia Petroleum Co. No. 28 Chilton, SW NE NW Section 4-4s-3w, was abandoned at 1,135 feet, total depth, after shooting failed to get results.

Caddo County

Ohio Oil Co. No. 1 Lackey, Account 3, NW SE NW Section 11-5-9w, Cement field, Caddo County, an old well, was deepened from 4,080 feet to 4,096 feet and flowed 238 bbls. of oil through tubing in four hours, with 50,000 feet of gas. It was estimated good for 1,500 bbls. of oil daily.

Same company's No. 4 Lackey, Account 2, an old well, flowed 327½ bbls. of oil in four hours and was estimated good for 1,800 bbls. daily, after plugging back from 4,273 feet to 3,742 feet. Gas gauged 750,000 feet.

Magnolia Petroleum Co. No. 4 Niles-Hopkins, NW NE NW Section 36-6-10w, an old well deepened from 2,441 feet, had a hole full of water and was abandoned at 3,403 feet, total depth.

Palmer Oil Corp. No. 1 Sterba, NE NE SW Section 35-6-10w, had dug cellar and pits. Phillips Petroleum Co. No. 1 Farwell, SW NW NW Section 35-6-10w, had dug cellar and pits.

Southwestern Oklahoma

In the Frederick pool, Tillman County, Indian Territory Illuminating Oil Co. completed No. 1 Goodwin, NW NW SE Section 1-3s-19w. It had Canyon lime at 3,130-37 feet, total depth, and flowed 723 bbls. of 40-gravity oil in six hours and 10 minutes; later was pinched in and flowed 250 bbls. of oil in 24 hours.

O. P. Burnham No. 2 Ellis, NW NE SE Section 6-1s-19w, Tipton pool, Jackson County, had granite wash at 2,440-2,552 feet, total depth, and flowed 190 bbls. of 39.4-gravity oil through tubing in 23 hours.

Joe S. Truitt No. 11 fee, SW SE SE Section 26-2n-11w, Lawton pool, Comanche County, was dry and abandoned at 370 feet, total depth.

Louis Sikes No. 8 Mulkey, Section 16-1s-8w, Duncan pool, Stephens County, had sand at 2,033-47 feet, was bottomed at 2,056 feet, and pumped 25 bbls. of oil daily.

New Operations

In Texas County, Hugoton gas district, Republic Natural Gas Co. No. 1 Clinkenbeard, NW NW SW Section 21-6n-14ecm; same operators No. 1 Thrall, C Section 22-6n-14ecm, and the company's No. 1 Blackmer, C Section 15-6n-15ecm, were locations.

In Logan County, Mid-Continent Petroleum Corp. No. 2 Campbell, SE SE NE Section 33-17-4w, Crescent pool, an old well, was rigging up to deepen from 6,103 feet to second Wilcox sand; same company's No. 6 Campbell, NE SE NE Section 33-17-4w, was rigging up to deepen from 6,120 feet to second Wilcox sand.

In Garvin County, Magnolia Petroleum Co. No. 2 Cowan, NW NW SW Section 15-1n-3w, an old well in the Robberson pool, was deepening below 1,762 feet.

In Latimer County, LeFlore County Gas & Electric Co. No. 28 Ramer, SW SW NW Section 12-6-22, was a location.

In Tulsa County, R. C. Hobbs and others No. 2-B Barber, CEL NW NW Section 24-17-12, was a machine.

In Muskogee County, J. R. Parks No. 3 Hildebrand, SW NE SE Section 17-14-19, was a rig.

In Stephens County, Louis Sikes No. 1 Fuerst, SE NE NW Section 16-1s-8w, Rainola pool, was waiting on cement at 20 feet.

East Texas Fields

(Continued from Page 247)

44 bbls.; No. 30 T. W. Lee, 3,530-3,600 feet, 32 bbls. B. Dunbar No. 1 Smith Heirs, 3,649-52 feet, 60 bbls. General American No. 28 M. Adams, 3,600-15 feet, 45 bbls. Humble Oil & Refining Co. No. 35 Armstrong, 3,558-3,626 feet, 80 bbls.; No. 18 A. Carter, 3,005-95 feet, 34 bbls. Joe Long Drilling Co. No. 29-A W. W. Owens, 3,551-62 feet, 64 bbls.; No. 36-A W. W. Owens, abandoned location. Shell Petroleum Corp. No. 29 A. N. and V. King, 3,562-3,689 feet, 74 bbls. Stanolind Oil & Gas Co. No. 16 O. J. Albright, 3,532-3,651 feet, 50 bbls.

Gregg County—Kilgore Area

Alsabrook & Nathan No. 3 Miller, 3,595-96 feet, 20 bbls. Pinaggio Brothers No. 3 M. E. Church, 3,663-90 feet, 44 bbls. Grace Oil Co. No. 5 Hughey, 3,500-13 feet, 40 bbls. Gulf Oil Corp. No. 50 A. Spear, 3,541-54 feet, 50 bbls. Wrather No. 6 Hughey, 3,538-62 feet, 20 bbls. A. B. C. D. Syndicate No. 9 J. L. McNeely, 3,632-33 feet, 30 bbls. Shell Petroleum Corp. No. 80 J. B. Watson, 3,586-3,700 feet, 44 bbls.; No. 81 J. B. Watson, 3,550-3,667 feet, 54 bbls. Sun Oil Co. No. 21 Rollins, 3,575-3,608 feet, 43 bbls.

Rusk County—Kilgore Area

Delta Drilling Co. No. 10 C. E. Christian, 3,638-39 feet, 10 bbls. Gulf Oil Corp. No. 22 Florence, 3,676-79 feet, 40 bbls.

Rusk County—Joiner Area

Hurt No. 18-A Ashby, 3,592-3,654 feet, 10 bbls. Humble Oil & Refining Co. No. 17-C Ida Holt, 3,610-3,750 feet, 60 bbls.; No. 17-B C. Ashby, 3,581-3,631 feet, 8 bbls. Ohio Oil Co. No. 48 S. H. Moores, 3,655-3,743 feet, 36 bbls.

Smith County—Joiner Area

Magnolia Petroleum Co. No. 23 R. Loosier, 3,705-07 feet, 80 bbls. Stewart No. 4 S. S. Cook, 3,728-35 feet, 20 bbls.

EAST CENTRAL TEXAS COMPLETIONS

Franklin County

In the Talco pool, Humble Oil & Refining Co. No. 5 Norman-Prince, 4,220-86 feet, 351 bbls.

Henderson County

Humble Oil & Refining Co. No. 2 J. J. Hearne, 3,055-57 feet, 274 bbls.

Kaufman County

W. G. Martin No. 2 Martin, dry and abandoned at 3,549 feet.

Rusk County

J. W. Merrick No. 1 Peter Tipps, dry and abandoned at 3,983 feet.

Titus County

Humble Oil & Refining Co. No. 10 M. Galt, 4,226-81 feet. 108 bbls.

Illinois Fields

(Continued from Page 245)

Effingham County: Carter Oil Co. No. 1 Tennery, SW SE SW Section 31-9n-4e, still testing, total depth 1,573 feet, after plugging back.

Christian County: Swords & McDougall No. 1 B. Warren, NW SE SE Section 23-11n-1e, set 12½-inch casing at 44 feet, and drilling at 260 feet.

Shelby County: Kingwood Oil Co. No. 1 Staley, SE NE NE Section 17-12n-4e, Ste. Genevieve lime at 1,927 feet, Roseclaire at 1,980 feet, Fredonia at 1,986 feet, shut down at 2,070 feet.

Montgomery County: Baker & Martin No. 1 Satterlee, near NW SW SW SE Section 3-8n-5w, rig burned; Myers and others No. 1 Klekamp, SW SE Section 29-8n-5w, Weller sand at 555 feet, Bethel at 612 feet with a small showing of oil, total depth 910 feet, shut down.

Clay County: Duncan Oil Co. No. 1 Ullom, C W half SW NW Section 22-2n-8e, dry and abandoned, total depth 3,100 feet.

St. Clair County: Neil No. 1 Pfeffer, 900 feet from S and 330 feet from E lines of NE quarter Section 30-2n-6w, drilling at 840 feet.

McDonough County: O. H. Hammer No. 1 Jones, C NW Section 22-7n-3w, of fourth p.m., drilling at 575 feet.

Richland County: Lake & Allen No. 1 Hazel, C NE NW Section 22-2n-9e, derrick; Pure Oil Co. No. 1 Wakefield, C NE NW Section 26-4n-9e, McClosky lime at 2,926 feet, coring at 2,985 feet.

Lawrence County: Hanke and others No. 1 Carrie, C SE SE Section 21-2n-13w, machine in.

OHIO

FINDLAY, Ohio, Sept. 19.—Ohio operators report 19 completions for the week, nine gas wells, two oil wells and eight dry holes.

In Athens County, Canaan Township, Speary Oil & Gas Co. No. 5 R. A. Smith, Section 12, is a gas well in the Stray sand making 500,000 feet per day at a depth of 554 feet. In Carthage Township, C. W. Nuzum No. 1 L. R. Pierce, Section 33, was dry in the Maxon sand at 1,130 feet.

In Fairfield County, Bern Township, City Natural Gas Works No. 1 Mathias Brillman, Section 7, is making 100,000 feet of gas from the Clinton sand at 2,086 feet. In Walnut Township, City Natural Gas Works No. 1 Sarah E. Wagner, Section 20, is good for 100,000 feet of gas in the Clinton sand at 2,077 feet.

In Licking County, Mary Ann Township, St. Albans Drilling Co. No. 1 Purley Wright, Lot 6, made 2½ bbls. of oil the first 24 hours after a shot in Berea sand at 765 feet. Rutledge & Mosholder No. 1 Carrie McArtor, Lot 20, is a small Berea gas well at 812 feet. Hoover Brothers No. 2 Homer Wells, Lot 23, made 130,000 feet of gas from the Berea sand at 736 feet. Armbruster & Stricker No. 1 Job R. Davis, Lot 8, is good for 125,000 feet of gas from the Berea at 660 feet. In Perry Township, Vandergrift Oil Co. No. 2 A. C. Mauk, Section 16, made 10 bbls. of oil the first day after a shot in Berea sand at 782 feet.

In Guernsey County, Millwood Township, M. J. Purdy No. 1 J. R. Bates, Section 15, is a Berea gas well making 100,000 feet per day, total depth 1,480 feet.

In Monroe County, Malaga Township, George Vandergrift No. 1 August Landefeld, Section 22, is a small gas well in the Berea at 2,009-14 feet.

In Morgan County, Penn Township, Penn Contracting Co. No. 2 Webster McPeak, Section 17, was dry in the Salt sand at 870 feet.

In Meigs County, Sutton Township, Tyree and others No. 1 E. W. Decker, Section 16, was abandoned at 496 feet.

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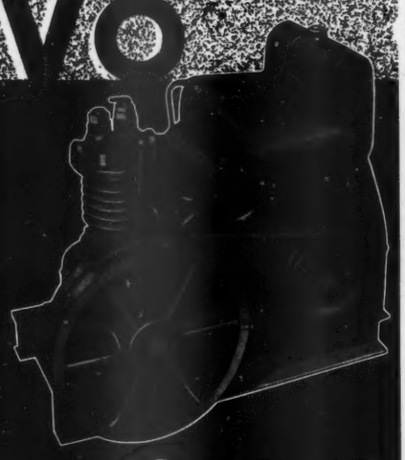

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SHEAR-RELIEF VALVE

Michigan Field Report

By
O. C. PRESSPRICH

Allegan County Stands Out in State's Completed Work

SAGINAW, Mich., Sept. 19.—Three Michigan oil pools vied for major attention the past week, which witnessed the largest number of completions in months. Allegan County field in southwestern Michigan, headed by the new Overisel pool, led with 12 producers; Van Buren County's new Bloomingdale pool added two prolific oil wells, and the Freeman Township pool in Clare County looked better than ever with one new discovery offset and greatly increased output after a second acid treatment at nearby producers.

It was a week to gladden the hearts of operators with 21 new oil wells in all fields adding to daily output, though 11 dry holes, mostly in wildcat territory, served somewhat to take the edge off their joy. One other fly in the ointment was an outcropping of water in some of the tests in the northwest corner of the Overisel pool.

The Overisel Township field proper, with five new wells adding to the daily potential, showed a northwesterly trend of development in the township, temporarily shadowed by two dry tests. Monterey Township, cornering Overisel to the southeast, added three producers and one dry hole. At least one of the Monterey wells, good for 500 bbls. daily, was an extension of the Overisel Township pool. Heath Township, directly south of Overisel, added two producers, both of which could be regarded as southerly extensions of the Overisel pool.

Van Buren County's Bloomingale pool, tapped three weeks ago at Fisher-McCall Trust No. 1 Wiggins Estate, SE SW SE Section 9-1s-14w, contributed a pair of producers both of which topped 1,000 bbls. daily natural output, and ranked higher than the discovery wildcat. The Van Buren field is about 20 miles south and slightly east of the Overisel pool.

Shallow production is indicated in Bloomingdale as the discovery tapped pay at 1,220 feet, in the Traverse, and last week's tests point to low drilling costs and prolific production. In Overisel Township the oil pay lies 235 to 250 feet deeper than in Bloomingdale. Central Michigan fields vary from 3,200 to 3,900 feet for their pay zones.

Southwestern Michigan's two major developments of the week failed to detract from significant extension of Freeman Township's Clare County pool in North Central Michigan. While only one new producer was added during the week, with one dry hole about 1½ miles west of the discovery, a second acid treatment of an already prolific well resulted in more than doubling production. Offset tests to the discovery well already have revealed the pay zone thickness to exceed 16½ feet, regarded as highly favorable to prolific production.

Allegan County

Overisel Township (4n-14w)—Five oil wells, all but one outside the discovery section (Section 36) pointed to a northwest trend of production in Overisel, and extended production considerably into the center of the township from the discovery spot in the extreme southwestern part. Section 21 had three new wells and one dry hole, while Section 26, still showing a northwest trend, had one producer, and Section 36, the discovery section, added another. William Cline No. 4 Aldrich, NW SW SE Section 36, fourth of the successful tests on the discovery plot, was acidized to an estimated 450 bbls. daily, with prospects of going above 500 bbls. To the northwest Charles Smith No. 5 Huizen, SE SE SE Section 26, continued to reveal a prolific production vein by acidizing to 300 bbls. daily. This test was the first showing extension of the pay streak northwesterly. Still further to the northwest of the discovery hole, other successful wells were developed. Stewart Oil Co. brought in a pair, No. 2 Oldebekking, W half E half SE Section 21 was a 300-bbl. acidized producer, and the No. 3 Oldebekking, SW SE SE Section 21, a 400-bbl. acid-treated well. Both are more than 3 miles northwest of the discovery well. Swanson Consolidated Oil Co. No. 1 Hoffman, SW NE SE Section 21, continued to develop a favorable sector of the northwest trend with a 125-bbl. acidized producer. While somewhat less productive than its neighbors in the southeastern part of the section, it nevertheless was rated highly favorable as well as a trend indicator. What appeared to be an edge test just outside the northwest trend in Overisel, but still in the southeast section of Section 21, was one of the Overisel failures of the week. It was Wagner & Smith Petroleum Co. No. 3 Slotman, NE SW SE Section 21, which proved dry. Other oil wells in Section 21 were slightly northeast of the dry test, more in line with the northwest trend. The second Overisel failure only strengthened the nearly direct northwest production line, when Michigan Devonian Petroleum Corp. No. 1 Lampen, NE NW SE Section 28, directly south of Section 21, came in dry and was abandoned.

Monterey Township (3n-13w)—Best of the three Monterey producers of the week, directly in line with the northwest-southeast prduction trend from the Overisel pool, was Lentz & Miller No. 2 Boerman, SW SW NW Section 6, cornering Section 36, of Overisel. The test rated 500 bbls. after acid and continued gradual extension of the field in the northwest part of Monterey. Southeast of the Boerman well in Section 8, Rex Oil & Gas Co. No. 3 Hartman brought in an 80-bbl. acidized producer, still in the production trend of Overisel. A small producer was tapped at R. M. Burch No. 2 Miller, NE NE NE Section 8, less than a mile south of the Rex-Hartman well. It developed only 20 bbls. after acid. This decline was taken as an indication that the test is off the southeasterly line from Overisel. The one Monterey dry hole of the week was W. E. Ross No. 2 Skinner, SE NW NE Section 17, which failed to log a showing of oil.

Heath Township (3n-14w)—South extension of the Overisel pool into Section 1 of Heath Township continued to develop highly favorable producers. Two of the best natural wells in the field were brought in the past week. Gordon Oil Co. No. 6 Scholten, NE NE NW Section 1, gauged 750 bbls. daily, while Fortney Oil Co. No. 3 Wessling, SE NE NE Section 1, was rated at 600 bbls. daily, natural flow. Both were to be allowed to produce in the natural state until a decline in production is noted before being treated.

Van Buren County

Bloomingdale Township (1s-14w)—High production honors for all Michigan fields for the week was claimed by the state's youngest wildcat pool, discovered August 18 when oil flowed 20 feet above ground at Fisher-McCall Trust No. 1 Wiggins Estate, SE SW SE Section 9. The two new producers in the field rated as equals of any in the state for natural production. Rex Oil & Gas Co. No. 1 Williams, SW SE SE Section 9, was rated 1,500 bbls. daily, producing from the shallow Traverse, and Fisher & McCall Trust No. 2 Wiggins, NE SW SE Section 9, north offset of the discovery well, rated 1,000 bbls. naturally, approximately the same as the discovery well. An extensive exploration play in Bloomingdale already is under way, with three or more producers due to top the shallow pay within 10 days.

Clare County

Freeman Township (18n-6w)—Central Michigan's bid for attention was two new oil wells and one dry hole, and greatly increased output from other producers in the area through second acid treatments. Gulf Refining Co. No. 2 Van Horn, SW SE NW Section 3, a southeast offset to the discovery well began to fill with oil late in the week when 3 feet in the Monroe pay. Higelmire Trust No. 2 Van Horn, SW SE NW Section 3, south offset to the discovery well and the deepest test in the area, was acidized to 2,500 bbls. daily production, after rating about 1,200 bbls. naturally. Gulf Refining Co. No. 1 Van Horn, east offset to the discovery well, was given its second acid treatment and ran a gauge of 1,200 bbls. daily. A second treatment at the Higelmire Trust discovery well increased production from the original 800 bbls. daily to about 2,000 bbls. The Higelmire No. 2 Van Horn was reported 16½ feet into the Monroe and producing 2,500 bbls. J. V. Wicklund Development Co.'s flank test, No. M-3 State, NE NW SE Section 5, 1½ miles west of the discovery well, was a failure. Top of the Monroe was logged at 3,895 feet and water entered the hole at 3,908-13 feet. Formations were reported 30 feet lower than in the discovery.

Gladwin County

Buckeye Township (18n-1w)—No week would be complete in Michigan without some additions to production in Buckeye, the state's top producer. Two new ones were added the past week. Bell & Marks No. 3 Schember, NW SW NW Section 26, gauged 175 bbls. after acid, and Rex Oil & Gas Co. No. B-3 Ruck, NE NW SW Section 26, also rated 175 bbls. after acid. Both additions were in the south (Oard) pool.

Bentley Township (17n-2e)—One producer was added to the Bentley field this week, Fortney Oil Co. No. 2 Smart, SE SW SE Section 29, which gauged 75 bbls. per day after acid.

Gladwin Township (19n-1w)—Failure was recorded for the only active test in Gladwin Township, when Brehm Oil Co.-Robert Bond No. 1 Kitchen, NE SE NE Section 20, was abandoned at 1,400 feet.

Midland County

Edenville Township (16n-1w)—Sun Oil Co., one of the most active operators in the Edenville area, completed one producer and one dry hole the past week. No. B-13 State-Edenville, NE SW SE Section 27, inside proven territory, gauged 250 bbls., natural flow, and was scheduled for acid treatment. The No. F-1 State-Edenville, NW SW SW Section 33, a southwest flank test, was a failure and was scheduled for abandonment.

Arenac County

Adams Township (19n-3e)—Tapping a Dundee producer, the Sterling Drilling Co. No. 2 Shearer, NW SW NE Section 26, was good for 40 bbls. per day after it was acidized. Most of the Adams production is from the Traverse sands.

Clayton Township (20n-4e)—Swanson & Rowmor Corp. No. 5 Shepard, SE NW SW Section 4, was acidized and production increased to 150 bbls. daily from Traverse pay.

Ogemaw County

West Branch Township (22n-2e)—Weber Oil Co. No. 5 Crawford, NW SW NE Section 28, gauged 100 bbls. after acid.

Wildcat Failures

Five wildcat failures in as many counties faced abandonment to raise total dry holes for the week to 11. The five dry holes: Port Sheldon Township (6n-16w), Ottawa County—W. F. Newhouse No. 1 Zwemer, NE NW NW Section 25; Crystal Township (10n-5w), Montcalm County, D. Sessions No. 1 Louks, SW NE NW Section 13; Enterprise Township (23n-5w), Missaukee County, C. W. Teater No. 1 Gray, NE SW SW Section 32; Newark Township (10n-3w), Gratiot County, Lakeland Refinery Co. No. 1 Munson, C SW quarter Section

(Continued on Page 264)

West, Central and Panhandle Texas

Cochran, Hockley Counties Attracting Much Attention

By D. H. STORMONT

FORT WORTH, Tex., Sept. 19.—The North Permian basin area again headed the development in West Texas while West Central Texas showed a considerable decline from the past week. The Livermore-Wright area of Cochran County and the rapidly expanding Slaughter pool in Hockley County are both receiving much outpost development. Texas Co. No. 1 Wright, League 123, Potter County School lands, 1¾ miles northwest of George P. Livermore No. 1 Wright, small pool opener in east central Cochran County, is showing an estimated 30 bbls. of oil per day while cleaning out after shot from 4,880-4,910 feet. The test was plugged back from 4,939 feet where water was logged. Three miles northwest of the Livermore discovery well, Magnolia Petroleum Co. is drilling below 4,100 feet on its No. 1 D. S. Wright, Labor 7, League 96, Mills County School lands.

Three and one-quarter miles northeast of the Slaughter pool in southwestern Hockley County, Gulf Oil Corp. No. 2 Mallett, Labor 25, League 34, Concho County School lands, is flowing by heads every 15 minutes after a two-stage acid treatment of 1,000 gallons and 5,000 gallons. The test is bottomed at a plugged-back depth of 5,070 feet in lime. Two miles northwest of the area, Texas Co. No. 1-B Mallett is drilling below 2,518 feet. One-half mile east of the south end of the area, Snowden & McSweeney are drilling below 4,200 feet on their No. 1 Slaughter.

In Yoakum County, Shell Petroleum Corp. No. 4 Roberts, Section 793, Block D, quarter mile south and west extension to the Roberts area in the southwestern part of the county, swabbed 71 bbls. of oil in a seven-hour test and was preparing for second-stage acid treatment. Test is bottomed at 5,164 feet in lime.

Deep Tests Abandoned

Two deep tests in the south basin area were finally abandoned after having been in the process of drilling or testing for almost a year. In northern Pecos County, just west of the Pecos River, Magnolia Petroleum Co. abandoned No. 1-A Tex-Mex-McKee after drilling to a total depth of 6,267 feet and testing all possible horizons as the hole was plugged back. This test established two main markers for the area when it topped the Simpson formation of the Ordovician at 4,775 feet and the Ellenburger at 6,102 feet.

Just north of the Sand Hills Ordovician production of northern Crane County, Gulf Oil Corp. abandoned its No. 4 McKnight after drilling to a total depth of 6,558 feet. The test topped the Simpson at 6,160 feet and the Ellenburger at 6,543 feet.

Central Basin Area

Andrews County got a new wildcat location when Rogers & Rogers staked a 1¾ miles north outpost to their No. 1 O. B. Holt, discovery well of several months ago. The test will be No. 1 University, Section 40, Block 9, University Lands Survey. The discovery well in Section D, Block 43, was completed for an initial of 225 bbls. of oil per day.

In Ector County, Sinclair Prairie continued testing No. 2-B Paul Moss, one-half mile southwest outpost to the Moss area. The productive producer has been shot with 165 quarts from 3,950-90 feet and is now testing about 25 bbls. of oil per day. The test is bottomed at 4,002 feet plugged back from 4,177 feet.

WEST CENTRAL TEXAS

Activity in West Central Texas showed a large drop from the week previous with only developments in Jones and Fisher counties centering much attention. A new producing horizon for Jones County was discovered when Humble Oil & Refining Co. No. 1 Graves, Section 41, Block 18, T.&P. Survey, began flowing by heads after encountering oil sand from 2,378-90 feet. The well is believed to be producing from the Tannehill sand. It is an east offset to Humble Oil & Refining Co. No. 1 Horton, discovery well in the 2,900-foot Noodle Creek pay section.

In Fisher County, the discovery of an odorless, noncombustible gas in a wildcat test, analyzed as 82 per cent nitrogen, led officials of Forest Development Corp. of Abilene, to speculate on the possibility of having uncovered a small helium deposit. Laboratory report on the gas, which bubbled through 3,400 feet of drilling mud in Forest Development Corp. No. 1 Morrow, stated there was a likelihood helium was present, although samples submitted were not of sufficient quantity for complete determination. A second analysis is to be made. The test, in Section 48, Block 3, H.&T.C. Survey, had been drilled to 4,424 feet and plugged back to 4,195 feet.

WEST TEXAS COMPLETIONS

(24-hour tests)

Andrews County

Barnsdall Refining Co. No. 3 Ford, 4,300-4,457 feet, 1,512 bbls. Humble Oil & Refining Co. No. 49 Means, 4,340-4,510 feet, 6,203 bbls.

Brewster County

Toney Hess No. 1 May Decie, temporarily abandoned at 925 feet. G. H. Storey No. 1 Wilson, temporarily abandoned at 2,545 feet.

Crane County

Gulf Oil Corp. No. 4 McKnight, dry and abandoned at 6,558 feet.

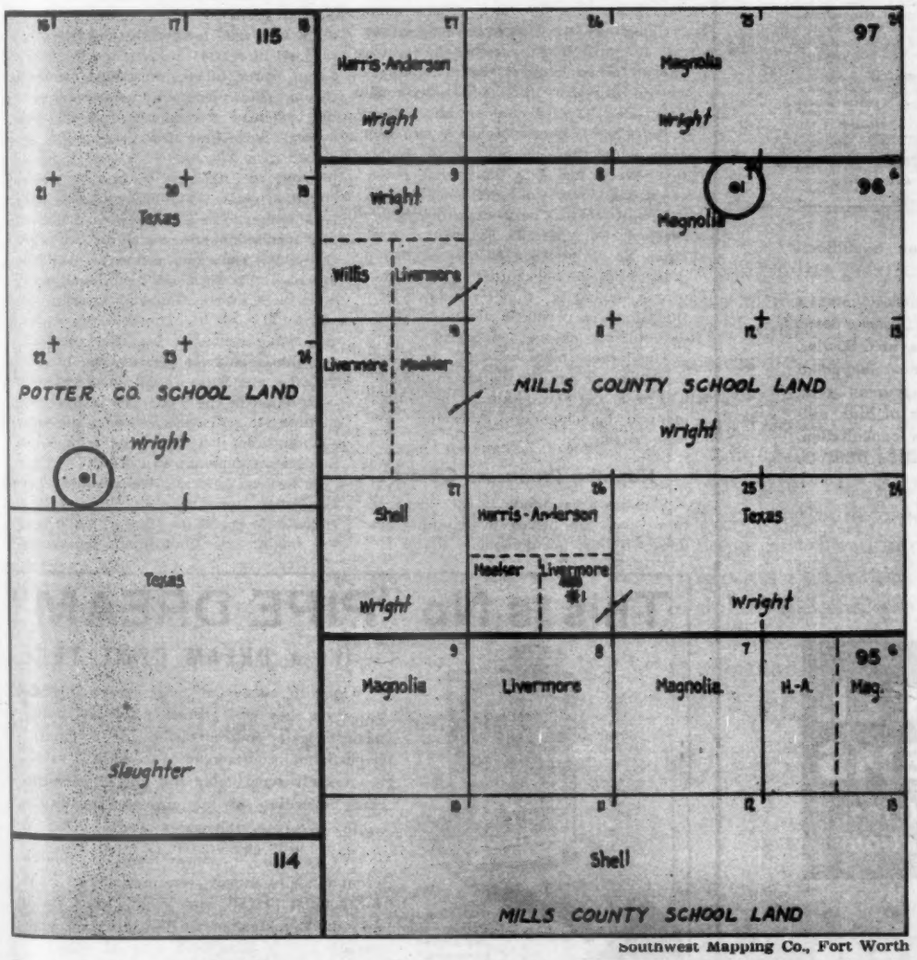
Crockett County

Short & Gillette No. 1 Owens, dry and abandoned at 1,993 feet.

Ector County

Goode and others No. 1 L. E. Wright, temporarily abandoned at 180 feet. Atlantic Refining Co. and Skelly No. 2-C University, 3,323-3,650 feet, 2,117 feet. Barnsdall Refining Co. No. 17 Foster, 4,070-4,227 feet, 863 bbls. Blackstock No. 5 T. & P. Land Trust, 4,030-4,168 feet, 2,617 bbls. Broderick & Calvert No. 3 J. E. Witcher, 4,138-4,305 feet, 1,370 bbls. J. P. Cusack No. 2 University, 3,385-3,665 feet, 340 bbls. Gulf Oil Corp. No. 4-A Connell, 3,405-3,660 feet, 371 bbls.; No. 116 Goldsmith, 4,100-85 feet, 32 bbls. Humble Oil & Refining Co. No. 21-C

(Continued on Page 268)



Southwest Mapping Co., Fort Worth

One-well Livermore-Wright area of Cochran County showing Texas Co. No. 1 Wright, prospective 1¾-mile west extension, and the Magnolia Petroleum Co.'s drilling well on the north

Another Big Paper Mill
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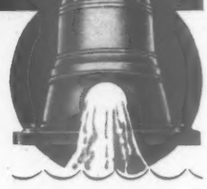

WITH a capacity of 18,000,000 gallons daily, three Layne designed, drilled, and turbine pump equipped wells now serve the Brunswick Pulp and Paper Company's newly erected Brunswick, Georgia, plant. These Layne wells were successfully passed through, and cemented against, bad water formations,—a task that required much skill and care. Special equipment was necessary to core through hard limestone formations for the setting of full size, 3/8 inch thick by 18 inch diameter, welded continuous steel casings. The casings were then cemented at the bottom to the Eocene formation.

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Canadian Fields

Completions and Operations in Northwest and in Ontario

By VICTOR LAURISTON

CHATHAM, Ontario, Sept. 17.—For the six months ending June 30, Canadian production increased from 1,061,681 bbls. in 1937 to 2,919,425 bbls. in 1938. New Brunswick increased from 6,927 to 8,857 bbls.; Ontario declined from 84,191 to 81,198 bbls.; and Alberta increased from 970,563 to 2,829,370 bbls.

Allowables Are Rearranged

Under an order of the Conservation Board, effective September 12, a new schedule of allowables for Turner Valley crude wells was put into effect. The daily market demand stands at 28,363.8 bbls., but the changes were necessitated by completion of Commoil No. 2 producer, and by the failure of a number of wells to actually deliver the quotas allowed them.

Under the new schedule, seven wells are given increases aggregating 3,300 bbls. a day; allowables of 42 wells are decreased; and two remain unchanged. Some 14 wells are cut in excess of 100 bbls. a day.

Under the first schedule of September 2, pipe lines were not handling enough crude to meet the demand. In several days 6,000 bbls. additional could have been handled. Some wells appear to have established potentials too soon after acidization; but most of the reductions are in line with the board's policy of cutting down excessive gas waste to the point where a desired gas-oil ratio is reached. For example, Foundation Royalties No. 1 before conservation had a potential of 450 bbls., utilizing 18,000 feet of gas per barrel. Under regulated flow the same well produces about 165 bbls. a day utilizing 600 feet per barrel.

Any largely increased flow from new producers, or any fluctuation in demand, will of course necessitate further adjustment in the schedule of allowables from time to time.

Naphtha Producers Object

A request was made to the Conservation Board on behalf of naphtha producers for the postponement of the date on which proration of gas wells becomes effective from September 14 to December 1. Proration now, it is claimed, would necessitate importation of naphtha from United States fields, as it is necessary in the manufacture of tractor fuel.

Delay in making the order effective was also asked to permit study of a scheme for utilizing the waste gas to repressure the Turner Valley field. If approximately 200,000,000 feet of gas per day heretofore wasted can be pumped back into the formations, the need for gas proration will be obviated and absorption plants will be able to continue operations.

A group of gas operators are planning to start court action to test the validity of the new provincial conservation act under which the order prorating Turner Valley gas wells was issued.

Turner Valley Completions

On the west flank of South Turner Valley, York Oils No. 1, LSD 2, Section 20-18-2w5, was finished in the black lime at 7,435 feet, 445 feet in the Madison. After being tubed, it started to flow through 2-inch orifice under the new testing system at a rate around 6,000 bbls. a day, the largest flush production yet recorded in Alberta. York Oils, Ltd., organized in 1937 is backed by Vancouver, British Columbia, interests, officers being: President, Viggo Laursen; vice president and managing director, G. R. H. Anderson; secretary, William Murphy; directors, Graham MacDonald, Brenton S. Brown, Homer C. Adams, Vancouver; Dennis K. Yorath, Tom Campbell, Calgary. Location was on acreage subleased from Okalta Oils, Ltd., of Calgary, and Royalite Oil Co. assisted in completion of the well. The company is planning to drill a second test in the same section, tentative location having been made some time ago in LSD 6.

In Section 5-19-2w5, West Central Turner Valley, Royalite Oil Co. No. 33, LSD 2, finished in the black lime at 7,676 feet, 432 feet in the Madison. It was tubed

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and acidized and made around 650 bbls. a day on official test.

In Section 29-18-2w5, Commoil No. 2, LSD 10, offsetting Commoil No. 1 producer to the south, finished 469 feet in the Madison at 7,665 feet depth. It was given allowable of 1,100 bbls. a day after acidizing.

Tests in the Lime

In Section 20-18-2w5, Sunset Oils No. 2, LSD 7, is finishing around 7,500 feet after getting the Madison at 7,068 feet. It is expected to be the next completion.

Consolidated Royalties No. 1, LSD 14, same section, has resumed after cementing casing 23 feet in the Madison at 7,568 feet.

Negotiations are in progress between Okalta Oils, Ltd., and Calgary & Edmonton Corp. with a view to the latter assisting in the completion of Okalta Oils No. 6, LSD 3, Section 30-18-2w5, now standing cemented at 9,745 feet after getting the Madison limestone at 8,731 feet. The test is about 2 miles west of the original Turner Valley crude discoveries.

West Flank Drilling

In Section 13-19-2w5, West Central Turner Valley, Sun Ray Oil Development Co. No. 1, LSD 8, is below 150 feet after setting surface casing for water shutoff.

In Section 5-19-2w5, Royalite Oil Co. No. 34, LSD 7, is below 4,548 feet. Royalite Oil Co. No. 37 has been spotted in LSD 11, same section, about one-fourth mile west of Vulcan-Brown No. 1 producer. This is the most westerly test yet undertaken in the section.

In Section 32-18-2w5, Royalite Oil Co. No. 36, LSD's 13-14, is below 459 feet. Davies Petroleums No. 4, LSD 10, is below 6,240 feet and getting close to the Home sand. West Turner Petroleums No. 3, LSD 6, is below 5,740 feet.

In Section 29-18-2w5, Command Oils No. 1, LS D14, offsetting Commoil No. 1 producer to the west, is below 5,566 feet and getting close to the grit beds.

In the same section, P & H. Development Co. No. 1 Alco, LSD 13, has been taken over by Lease Holdings, Ltd., headed by P. J. Hatterman van Oudenol, and will resume in the near future from 1,370 feet. Location is about a mile due west of Turner Valley Royalties No. 1 crude discovery well.

In Section 20-18-2w5, Producers Crude Corp. No. 1, LSD 11, is in the lower Benton formation below 5,653 feet.

In Section 17-18-2w5, Anglo-Canadian Oil Co. No. 3, LSD 10, is below 3,742 feet.

In Section 16-18-2w5, Brown Oil Corp. No. 5, LSD 12, is below 6,476 feet. Richwell Oil Co. No. 1, LSD 5, is in the Blairmore formation below 6,098 feet. Royal Canadian Oil Co. No. 2, LSD 4, is below 5,476 feet and in the Blairmore formation. Okalta Oil Co. No. 7, LSD 3, has concrete foundations for rotary equipment, to deepen from 3,050 feet.

In Section 9-18-2w5, D. & D. Oils No. 1, LSD 12, is below 1,985 feet. This is the only active test at present in the south end of the field. Anglo-Canadian Oil Co. No. 2, LSD 2, Section 33-16-2w5, is shut down at 6,280 feet, after encountering a recurrence of the Belly River formation at depth.

West of the proven South Turner Valley area, Scottish Petroleums No. 1, LSD 16, Section 19-18-2w5, is building derrick for rotary equipment, to resume from 950 feet. Anglo-Canadian Oil Co. No. 1, LSD 16, Section 31-18-2w5, is in the lower Benton formation below 6,411 feet.

Tests in the Foothills

On the Brazeau structure in the northern foothills west of Edmonton, Home Oil No. 1 Brazeau, LSD 16, Section 7-43-17w5, is working on casing at 4,520 feet.

On the Ram River structure 25 miles west of Rocky Mountain House, Ram River Oils, Ltd., is completing road to No. 1 location at Tawadina Creek and preparing to move derrick timbers and equipment from Phoenix.

North Turner Valley

In North Turner Valley, Home Oil Co. No. 2 Millarville, LSD 6, Section 33-20-3w5, is below 6,366 feet.

Royalite Oil Co. No. 35, LSD 7, Section 27-20-3w5, is below 2,180 feet.

East Side Drilling

On the New Valley structure northeast of Turner Valley, McLeod Oil Co. No. 1, LSD 4, Section 6-21-24w, is deepening from 8,430 feet after cementing casing at bottom.

On the Calling Valley structure, Sentinel Oil Co. No. 1, LSD 1, Section 8-20-2w5, is making a new hole below 6,820 feet.

British-American Deliveries

Crude oil and naphtha deliveries from the Turner Valley field to the British American Oil Co. in August totaled 207,808 bbls., against 169,187 in July.

Green Valley Test

On the Highwood-Sinclair structure southwest of Turner Valley, Green Valley Oils No. 1 Banner, LSD 6, Section 34-17-3w5, is standing at 6,202 feet after drilling 842 feet in the Madison limestone. It has apparently reached the black lime, generally regarded as the limit of production in the Madison, without getting commercial production, though some small gas showings were found and a little crude was bailed around 437 feet in the lime, which is close to the normal production depth in Turner Valley. It is planned to change to rotary outfit and deepen for a test of the underlying Devonian formation.

In Section 12-16-3w5, J. & J. Syndicate No. 1, LSD 8, is digging cellar and has equipment on location.

Watson Structure

On the Watson structure, north and west of Lundbreck, in the southern foothills, Mar Jon Oil Co. No. 3, LSD 3, Section 4-10-2w5, has heavy rotary outfit rigged to resume from 5,420 feet. Eight-inch casing is set at 5,100 feet. The test is in the lower Blairmore formation a short distance above the Madison limestone where commercial production is expected..

East Central Alberta

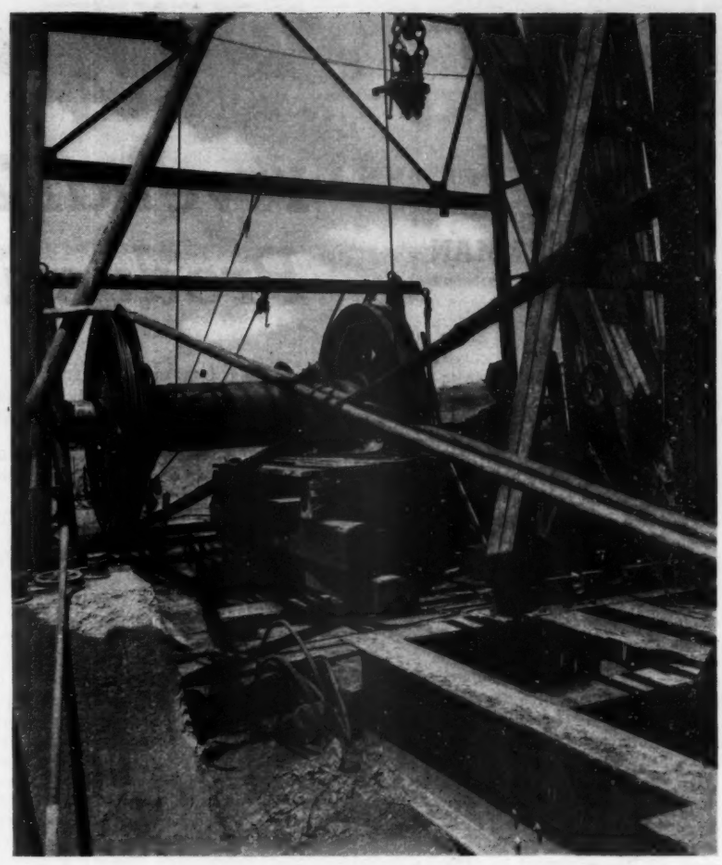
In the Vermilion area, East Central Alberta, Wain Town Gas & Oil Co. No. 1, LSD 16, Section 26-50-7w4, is running 6-inch casing to 1,004 feet for water shutoff before deepening to the gas sand. The company has made tentative arrangements for a franchise to supply gas to Vermilion. The project will involve 2 miles of transmission line and a local distributing system.

Border Fields

On the Rogers-Imperial structure east of Coutts, Range Oil & Gas Co. No. 3, LSD 15, Section 20-1-11w4, is resuming after recementing for water shutoff at 2,650 feet.

In the Taber field, Plains Petroleum No. 4, LSD 15, Section 25-9-17w4, is below 2,680 feet, drilling and carrying 6-inch casing.

In the Taber field, North Taber Royalties No. 1, LSD 7, Section 10-11-15w4, is preparing to drill out cement after setting 10-inch casing at 837 feet.



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California Field Report

By
L. P. STOCKMAN

Avenal Zone Yields Large Production in E. Coalinga

LOS ANGELES, Calif., Sept. 19.—The East Coalinga field of Fresno County monopolized the attention in the past week, during which one large flowing well was completed and drilling operations concluded on two other potential producers. The new well was No. 88 Grimes of Petroleum Securities Co. completed flowing 5,020 bbls. of 33.5-gravity oil and 5,000,000 feet of gas per day from the Avenal zone, with bottom of the hole at 6,968 feet. The initial production does not represent the well's maximum as it flowed through an 18/64-inch bean. It was later cut down to 500 bbls. daily. Completion pressures were 1,225 pounds and 1,605 pounds respectively on the tubing and casing. A 9⅝-inch water string was landed at 6,740 feet and the hole finished with 328 feet of 6⅝-inch liner including 199 feet of 100-mesh and 6,650 feet of 2½-inch tubing. This well is higher structurally than the discovery well of Petroleum Securities and took in 210 feet of the Gatchell zone with the bit still in the pay when drilling operations were concluded.

No. 88 Grimes is located northwest of No. 2 Gatchell, the discovery well, and while its completion did not greatly extend the productive limits of the field, other developments indicated that at least 1,200 acres can be considered as probably productive. Superior Oil Co. expects to have No. 1 Hight, a mile east outpost, in Section 8-20-16, ready for production within a few days. No. 1 Hight was given a formation test several days ago and flowed at the rate of 2,500 bbls. of 33.4-gravity oil and 2,500,000 feet of gas per day from 7,999 feet. The oil hit the surface 18 minutes after the test was started and the company used a 29/64-inch bean. It was decided to core ahead and consequently No. 1 Hight should be on steady production within a short time as it is doubtful that the company will take in very much of the zone in a well so far from the discovery well. No. 1 Hight is substantially lower structurally than either of the two producing wells of Petroleum Securities Co.

Petroleum Securities Co. expects to have another well on production in East Coalinga this week. It is No. 7-7-F, in Section 7-20-16, and with bottom of the hole at 6,925 feet the well has a penetration of 235 feet in the productive Gatchell zone. It is a north line offset to No. 2 Gatchell, the discovery well, and an east line offset to No. 86 Grimes of the same company. The oil sand cored in No. 1 Hight of Superior in Section 8-20-16, about 1 mile east of present production, tends to indicate that this field may cover a much larger area than originally expected. The western limits of production appear to have been defined by No. 1 Leavitt-Hintze of Universal Consolidated, as this outpost has not had a showing of oil down to the present depth, 7,990 feet. It is in the Cretaceous, which in the geologic column is below the Eocene, from which production is obtained in the East Coalinga field. None of the wells completed in this field has been given potential production tests but those familiar with existing conditions generally accept the statement that the two wells of Petroleum Securities Co. are capable of producing from 15,000 bbls. to 20,000 bbls. each. The brown-sugar oil sand is believed to have the heaviest saturation of any sand found in California up to the present. The sand is very porous and large grained.

Wilmington

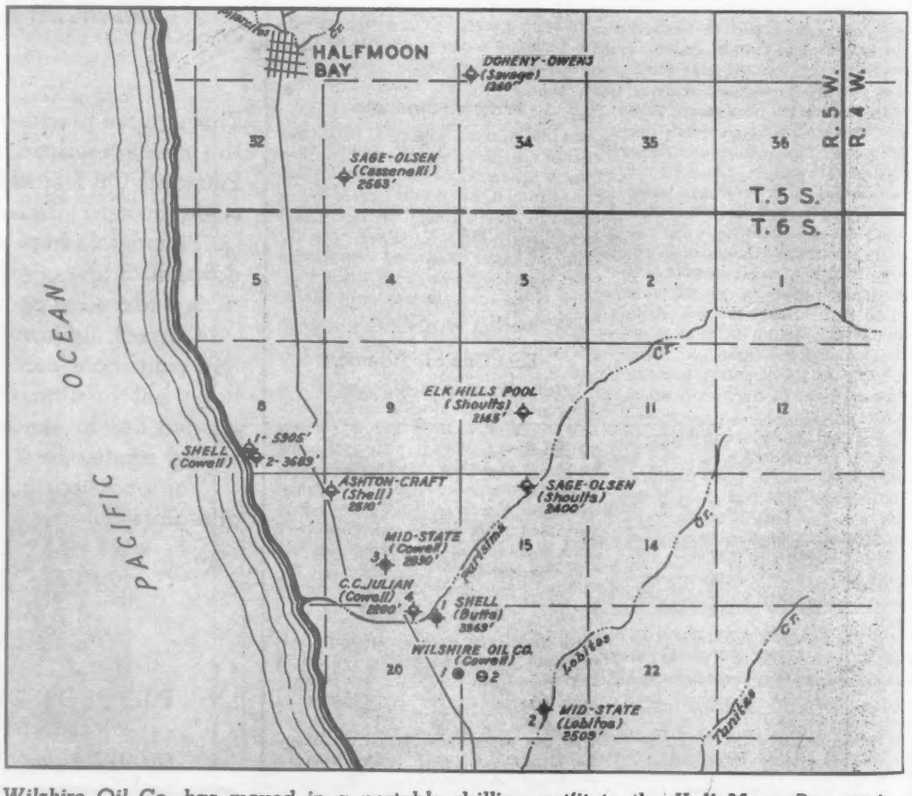
Seven new wells and one recompletion were recorded in the Wilmington field of Los Angeles Basin. Richfield Oil Corp. finished two new wells in the Ranger zone and one in the Terminal zone. The latter was No. 10 Pacific Dock, flowing 842 bbls. of 25.4-gravity oil and 350,000 feet of gas daily from 3,665 feet. The hole was finished with 1,068 feet of 7-inch liner landed at 3,664 feet and carrying perforations at 2,642-2,762 feet, 2,808-2,958 feet, 3,150-3,250 feet, and 3,559-3,664 feet and was cemented through perforations at 3,144 feet and 3,553 feet, respectively. It was brought in flowing through a 19/64-inch bean and showed a tubing pressure of 240 pounds and a casing pressure of 300 pounds. Richfield's Ranger zone wells were No. 1-G Long Beach Harbor Department and No. 27 Pacific Dock. The former flowed 337 bbls. of 18.7-gravity oil through a 19/64-inch bean daily from 3,190 feet, tubing pressure 140 pounds and casing pressure 180 pounds. The latter was completed flowing 286 bbls. of 18.3-gravity oil, cutting 2.5 per cent, through an 18/64-inch bean, from 2,632 feet, tubing pressure 270 pounds and casing pressure 350 pounds.

Allied Petroleum Co. No. 22, which encountered a heretofore unknown fault in the eastern end of the Long Beach Harbor section of the Wilmington field, has been completed flowing 636 bbls. of 25.8-gravity oil per day from 4,030 feet, after the well had been carried down to 4,346 feet and then plugged back. It was completed flowing through a 26/64-inch bean from the Terminal zone, and will probably cause additional drilling in the area which has heretofore been considered as productive only in the upper or Ranger zone. General Petroleum Corp. completed No. 1 Pacific Electric, but while this well started off flowing 1,224 bbls. per day, production declined subsequent to completion. It was bottomed at 4,100 feet and finished with a 6⅝-inch flow string landed on a seat at 3,003 feet and a combination 8⅝-inch and 6⅝-inch liner cemented through perforations at 3,055 feet and 3,410 feet and carrying perforations at 2,700-2,925 feet, 3,055-3,254 feet, 3,410-3,570 feet, 3,610-90 feet, and at 3,730-89 feet.

Sunray Oil Co., which took over a number of producing wells from Royalty Service Corp. earlier this year, has recompleted No. 7-A Nelson, flowing 745 bbls. of 29.7-gravity oil per day from the Ford zone at 5,627 feet. This well, a former upper-zone producer, was carried down to the Ford zone and finished with a 7-inch liner landed at 5,625 feet and cemented through perforations at 5,529 feet. The liner included 92 feet of 60-mesh screen opposite the productive zone. Hollywood Oil Co. No. 3 Baxter was good for 360 bbls. of 18.6-gravity oil per day from the Ranger zone with bottom of the hole at 3,112 feet. The hole was finished with 475 feet of 5¾-inch liner including 316 feet of 60-mesh perforations previous to being gravel packed and the flow was through a 23/64-inch bean. O'Kane & Brain No. 3-0 Long Beach Harbor Department has been completed flowing 171 bbls. of 16.8-gravity oil daily from the Ranger zone at 2,957 feet. This hole was finished with 416 feet of 8⅝-inch liner carrying 80-mesh perforations at 2,566-2,754 feet, 2,774-2,874 feet, and at 2,894-2,957 feet and 2,900 feet of 2½-inch tubing.

Torrance—Harbor City

In the Harbor City area south of the Torrance field, R. R. Bush Oil Co. completed No. 1 Gimenez flowing 540 bbls. of 28.6-gravity oil per day from 5,260 feet. It produced through a 42/64-inch bean and



Wilshire Oil Co. has moved in a portable drilling outfit to the Half Moon Bay region of San Mateo County, where preparations are under way to drill a second well on the Crowell lease where small but shallow production was developed by the company several months ago

showed a tubing pressure of 125 pounds and a casing pressure of 260 pounds. The hole was finished with 210 feet of 5¾-inch liner including 180 feet of perforated and a 7-inch water string at 5,070 feet. Rig was being built for the company's No. 1 Torino, near Leonardo and Frampton streets. Both wells are north of Lomita Boulevard and west of Normandie Avenue.

Five new wells and three recompletions were finished in the Lomita section of the Torrance field but production was relatively small. Fiat Oil Co. completed No. 1 Lomita, flowing 620 bbls. of 27.1-gravity oil per day from the zone now undergoing development at 4,966 feet. This well was only good for 150 bbls. per day on a preliminary production test with bottom of the hole at 4,513 feet but the addition of 43 feet of new hole changed a small well into a good completion. Jones-Long Oil Co. No. 2 Von Trik Lyons was good for 380 bbls. of 27.2-gravity oil and 700,000 feet of gas per day upon completion at 4,971 feet after the hole had been finished with 205 feet of 5-inch liner including 84 feet of perforated landed on bottom. Flow was through a 22/64-inch bean and this restraint resulted in a tubing pressure of 250 pounds and a casing pressure of 340 pounds.

California Star Oil Co. completed No. 1 Whitacre in the Torrance field, pumping 187 bbls. of 25.8-gravity oil cutting 4 per cent daily from 5,040 feet. This well was finished with a 5-inch liner including 60 feet of 100-mesh landed on bottom and cemented through perforations at 4,980 feet. This well was originally completed in the upper zone but was abandoned due to depletion and then reentered for deepening operations. Silver Strand Oil Co. No. 2 Lomita has been completed flowing 320 bbls. of 28.2-gravity oil daily from 4,952 feet, after the hole had been finished with a 6⅝-inch water string landed at 4,765 feet and 220 feet of 5-inch liner, including 188 feet of 125-mesh landed on bottom. Gunnar Erickson No. 3 Lomita finished at 4,980 feet with 5¾-inch water string cemented at 4,928 feet and 62 feet of 4-inch liner including 52 feet of perforated landed on bottom and then gun-perforated at 4,837-77 feet was good for 141 bbls. of 26.5-gravity oil per day on the beam. Packard Oil Co. finished No. 5, flowing 388 bbls. of 26.8-gravity oil per day from 4,985 feet and Pennsylvania Oil Co. has completed its initial well, No. 1 Lomita, pumping 159 bbls. of 19.7-gravity oil cutting 15 per cent. This well, which is producing the lowest gravity oil of any well in the lower zone, was carried down to 4,961 feet and then plugged back to 4,922 feet and the hole finished with 131 feet of 5¾-inch liner including 95 feet of 125-mesh landed at 4,922 feet. Gravity of oil from this well is 19.7 net corrected gravity, an unusually low quality. Maidum Oil Co. No. 1 Lomita has been completed flowing 145 bbls. of 26.5-gravity oil cutting 4 per cent daily from 5,129 feet. This well was finished with a blank string of 5¾-inch which was subsequently mechanically perforated at 5,060-5,120 feet.

Montebello

St. Helens Petroleum Co. recompleted No. 27 Monterey, in the west end of the Montebello field, where operators are aggressively developing a deeper productive zone, flowing 2,324 bbls. of very clean 35.3-gravity oil and 2,360,000 feet of gas per day through two 1½-inch beans under a tubing pressure of 180 pounds and a casing pressure of 1,050 pounds. This well was completed in the sixth zone of upper Miocene age a short time ago, but the well showed such a high gas-oil ratio that it was deemed advisable to plug back to the fifth zone of lower Pliocene age. By following out this proposal the company increased its crude oil production and at the same time substantially decreased production of gas. Montebello Wesco, Inc., has cored top of the sixth productive zone in No. 1 at 6,210 feet and preparations are under way to land a water string immediately preparatory to an early production test. Standard Oil Co. should complete the first of three wells in this field within the next three weeks. Union Oil Co. killed No. 1 Paul J. Howard, a fifth zone producer, and has started carrying it down to the sixth zone. Herley-Kelly No. 1 Burke Community, which stopped flowing several days ago, is being cleaned out in the hope of reviving production.

Ten Section

Shell Oil Co., in the Ten Section field of Kern County, completed one good well in that area this week and gave another a production test with unsatisfactory results. No. 67-20-B Kern County Land, in Section 20-30-26, was bottomed at 8,374 feet but plugged back to 8,225 feet and finished with 94 feet of 4¾-inch liner including 74 feet of perforated. On a production test it flowed 18 bbls. per hour but the output was cut and was still cutting 15 per cent late in the week. Shell No. 67-30-A Kern County Land, in Section 30-30-26, was finished flowing 2,754 bbls. of clean 33.5-gravity oil and 6,956,000 feet of gas per day from a depth of 8,220 feet. It topped the pay at 7,886 feet and has a 7-inch water string landed and cemented at 7,810 feet. Shell is starting a new well in the Ten Section field in addition to No. 81-29-B Kern County Land, the rig for which was erected some time ago.

Rosecrans

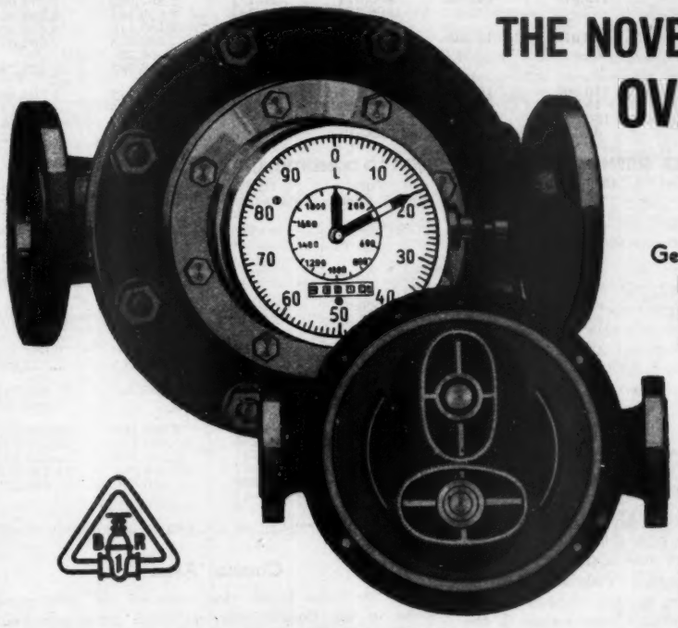
Union Oil Co. completed No. 24 Rosecrans but it did not come up to expectations and the company may undertake some remedial work unless production cleans up within another few days. This new well was completed flowing 25 bbls. per hour of 32.9-gravity oil cutting 14 per cent and tanked 515 bbls. of clean oil during the initial 24 hours following completion at 7,655 feet.

Canal

In the Canal field, which is held jointly by Shell Oil Co. and Ohio Oil Co., the former has completed No. 45-14-A Kern County Land in Section 14-30-25, flowing 2,299 bbls. of 34.5-gravity oil and 1,200,000 feet of gas per day from 8,340 feet. Ohio Oil Co., discoverer of the Canal field, is nearing completion depth with No. 8-E Kern County Land in Section 14-30-25.

San Joaquin Basin

In the Fruitvale field of Kern County in San Joaquin basin, Meridian Oil Co. has completed No. 5 fee in Section 23-29-27 pumping 184 bbls. of 17.4-gravity oil cutting 4.3 per cent daily from 3,108 feet. It was finished with 60 feet of 6⅝-inch liner, including 40 feet of perforated, landed on bottom. Next week Western Gulf Oil Co. should list No. 4 Price-Stewart in Section 22-29-27 as a recompletion as it is in the pay at 3,870 feet. In the Midway-Sunset field, Big Ten Oil Co. completed No. 12 in Section 36-



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TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	September 9		September 2			
Intercoastal-domestic—	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Crude oil	74,187	10,598	.....	.....	707,487	68,038
Diesel and gas oil	.....	.....	.....	.....	.....	176,726
Gasoline	49,534	7,076	.....	.....	2,437,678	2,836,281
Kerosene	.....	.....	.....	.....	257,005	328,907
Foreign exports—						
Crude oil	49,437	7,062	418,633	59,805	16,457,512	9,940,550
Fuel oil	50,642	7,235	72,471	10,353	6,074,772	9,828,335
Diesel and gas oil	218,762	31,252	87,640	12,520	4,569,515	5,646,911
Gasoline	78,268	11,181	.....	.....	5,723,440	6,062,418
Kerosene	.....	.....	.....	.....	687,555	1,589,462
Lubricants	.....	.....	.....	.....	103,127	.....
Other unfinished oil	.....	.....	.....	.....	.....	849,163
Coastwise-domestic—						
Crude oil	189,035	27,005	242,180	34,597	8,603,100	3,403,258
Fuel oil	293,529	41,933	201,266	28,752	7,587,214	10,700,412
Diesel and gas oil	6,603	943	35,929	5,133	1,091,160	1,459,680
Gasoline	125,442	17,920	215,906	30,844	10,411,830	10,875,758
Kerosene	7,245	1,035	13,177	1,882	175,508	272,401

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic—						
Diesel and gas oil	17,982	2,569	.....	.....	196,644	152,932
Gasoline	.....	.....	.....	.....	25,409	25,778
Kerosene	.....	.....	.....	.....	16,124	.....
Asphalt	.....	.....	.....	.....	418,700	278,026
Lubricants	.....	.....	.....	.....	16,905	22,472
Foreign exports—						
Crude oil	20,452	2,922	314,066	44,867	4,208,427	1,957,468
Fuel oil	115,978	16,568	165,974	23,711	1,897,913	1,577,092
Diesel and gas oil	.....	.....	190,733	27,248	2,158,561	2,239,528
Gasoline	.....	.....	224,377	32,054	4,189,116	3,632,308
Kerosene	78,419	11,203	95,847	13,692	652,558	683,076
Asphalt	.....	.....	.....	.....	56,258	.....
Lubricants	.....	.....	3,731	533	352,592	425,740
Coastwise-domestic—						
Fuel oil	116,905	16,701	122,481	17,497	4,234,542	4,599,506
Diesel and gas oil	15,211	2,173	50,409	7,201	1,016,745	846,143
Gasoline	180,697	25,814	280,161	40,023	5,457,451	3,606,104
Kerosene	31,753	4,536	29,512	4,216	381,348	188,822

TOTAL TANKER SHIPMENTS FROM CALIFORNIA TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic—	this week Total	average Daily	Total last week	Daily average	This year to date	Same time last year
Crude oil	74,187	10.598	.....	.....	707,487	68.038
Diesel and gas oil	17,982	2,569	.....	.....	196.644	329,658
Gasoline	49,534	7,076	.....	.....	2,463,087	2,862,059
Kerosene	.....	.....	.....	.....	273.129	328.907
Asphalt	.....	.....	.....	.....	418,700	278,026
Lubricants	.....	.....	.....	.....	16,905	22,472
Foreign exports—						
Crude oil	69,889	9,984	732,699	104,671	20,665,939	11,898,018
Fuel oil	166,620	23,803	238,445	34,064	7,972,685	11,405,427
Diesel and gas oil	218,762	31,252	278,373	39,768	6,728,076	7,886,439
Gasoline	78,268	11,181	224,377	32,054	9,912,556	9,694,726
Kerosene	78,419	11,203	95,847	13,692	1,340,113	2,272,538
Asphalt	.....	.....	.....	.....	56,258	.....
Lubricants	.....	.....	3,731	533	455,719	425,740
Other unfinished oil	.....	.....	.....	.....	.....	849,163
Coastwise-domestic—						
Crude oil	189,035	27,005	242,180	34,597	8,603,100	3,403,258
Fuel oil	410,434	58,633	323,747	46,250	11,821,756	15,299,918
Diesel and gas oil	21,814	3,116	86,338	12,334	2,107,905	2,305,823
Gasoline	306,139	43,734	496,067	70,867	15,869,281	14,481,862
Kerosene	38,998	5,571	42,689	6,098	556,856	461,223

32-23 pumping 35 bbls. of 14.6-gravity oil cutting 4 per cent daily from 1,265 feet after the hole had been carried down to 1,273 feet and then plugged back because of bottom water. Vanguard Oil Co. abandoned No. 1 Heavilin in Section 34-32-24 in this field at 4,600 feet as no showings were logged in the Maricopa brown shale, topped at 4,325 feet. In the Mount Poso field, along the eastern rim of San Joaquin basin in Kern County, Ring Oil Co. completed No. 7 Bowles in Section 29-26-28 at 1,740 feet and No. 3 Rogers-Jones in the same section at 1,691 feet and while pumping equipment has been installed in both wells they are not being tested in order to enhance curtailment especially in the heavy unrefinable crude oil range.

Coastal Area

In the Gato Ridge field, one of the productive areas in the Coastal district which comprises Ventura, Santa Barbara, and San Luis Obispo counties, Petrol Corp. completed No. 5-11 Magenheimer in Section 9-8-32 pumping 830 bbls. of 14.8-gravity oil per day from 4,714 feet after the hole had been finished with a 7-inch liner and a 10¾-inch water string at 1,890 feet. Only three wells are drilling in the Santa Maria Valley field and one, Hancock-Bush Oil Co. No. 3 Bradley Lands in Section 26-10-34, should be listed as a completion within a few days. Top of the Santa Margarita was logged at 4,720 feet and an 8⅝-inch water string cemented at 4,760 feet. In the Ventura Avenue field, Bolsa Chica Oil Co. will drill a direct offset to General Petroleum Corp. No. 18 Barnard, recently completed as a large well from 8,410 feet. The latter company has also finished plans to carry another well down to the deep 57 zone and is cleaning out No. 16 Barnard preparatory to resuming drilling at 5,449 feet at which depth it was originally completed several years ago.

Michigan Fields

(Continued from Page 258)

26; Deerfield Township (14n-5w), Isabella County, C. W. Teater No. 1 Bellinger, SW SE SE Section 32.

30 Drilling Permits

Hint of the intensity of the exploration in progress and yet to come in the region of Michigan's three newly found oil pools is contained in the weekly list of drilling permits issued by the state conservation department of which 14 were in Allegan County fields, six in the Freeman-Redding territory in Clare County, five in the Bloomingdale district of Van Buren County. These three counties accounted for 25 of the 30 permits issued during the week, with Midland and Gladwin counties listing two each, Arenac County one. The 14 Allegan County permits were divided among eight townships—Allegan, Cheshire, Dorr, Heath, Hopkins, Monterey, Overisel and Salem.

N. Y.-Penna. Gas Fields

(Continued from Page 246)

Quadrangle Drilling Co. is drilling at 3,095 feet on the Hilligas No. 2 farm and is building the rig on the G. Lampe farm and Cunningham Natural Gas Co. is drilling at 1,810 feet on the William Shear farm and is building the rig on the Fortner farm, other Willing Township operations.

Belmont Quadrangle Drilling Co. is also drilling at 4,120 feet on the A. H. Billings farm, Independence Township.

Another active operation was added to the Pennsylvania lists as Hanley & Bird spudded in their test on the F. Rook No. 2 farm in Harrison Township, Potter County. G. L. Cabot, Inc., is drilling at 765 feet on the Frank Raymond farm, Bingham Township, and is building the rig on the Emma Elliott farm, Harrison Township, also in Potter County.

McKenry and others are drilling at 4,837 feet, still in the Onondaga, on the Stellman farm, Rockland Township, Venango County; Updegraph is shut down at 5,630 feet on the O. E. Erickson farm, Elk Township, Warren County, and Wasson and others are fishing at 5,358 feet on the E. S. Collins farm, Howe Township, Forest County, the extreme wildcat operations now under way in Pennsylvania.

STANDARD OIL CO. OF CALIFORNIA AND UNION OIL CO.
Crude oil prices at the well effective June 22, 1936

Gravity—	Signal Hill (Long Beach)	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda-Brea Canyon	Athens-Rosecrans	Dominguez	Elwood Terrace	Torrance	Richfield	Whittier E. Coyote (La Habra)	Montebello	W. Coyote Hills	Santa Fe Springs	Mountain View	Elk Hills Buena Vista Hills Midway-Sunset Lakeview Area	Lost Hills	Coalinga —	Wheeler Ridge	Kettleman Hills	Santa Paula*	Orcutt*
14-14.9	$.80	$.79	$.74	$.78	$.79	$.80	$.76	...	...	...	$.80	$.76	$.76	$.77	$.78	...	...	$.70	$.70	$.70	...	...	$.70	...
15-15.9	.80	.79	.74	.78	.79	.80	.76	...	...	...	.80	.76	.76	.77	.78	...	...	.70	.70	.70	...	...	.70	...
16-16.9	.80	.79	.74	.78	.79	.80	.76	...	...	...	.80	.76	.76	.77	.78	...	...	.70	.70	.70	...	...	.70	$.70
17-17.9	.80	.79	.74	.78	.81	.80	.76	...	...	...	.80	.76	.76	.77	.78	...	...	.70	.70	.70	...	...	.71	.70
18-18.9	.80	.79	.74	.78	.84	.80	.78	...	...	...	.82	.76	.76	.77	.78	...	...	.70	.70	.70	...	...	.73	.72
19-19.9	.82	.79	.74	.82	.87	.84	.81	...	...	...	.85	.76	.78	.77	.78	...	$.70	.74	.74	.71	$.70	...	.75	.74
20-20.9	.85	.79	.74	.85	.90	.88	.84	...	...	...	.88	.78	.82	.77	.80	...	.70	.78	.78	.72	.70	...	.77	.77
21-21.9	.88	.79	.74	.89	.93	.93	.88	...	...	...	.91	.80	.85	.77	.84	$.78	.73	.82	.82	.74	.70	...	.79	.80
22-22.9	.92	.82	.74	.92	.96	.98	.92	...	...	...	.93	.84	.89	.79	.88	.78	.77	.87	.86	.78	.72	...	.82	.83
23-23.9	.95	.86	.77	.96	.99	1.02	.96	$.84	$.79	...	.96	.88	.93	.82	.92	.78	.80	.92	.90	.82	.76	...	.85	.86
24-24.9	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81	...	.99	.91	.96	.85	.96	.82	.84	.97	.94	.86	.79	...	.87	.88
25-25.9	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83	...	1.02	.95	...	.89	.99	.86	.88	1.01	.98	.90	.83	...	.90	.91
26-26.9	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86	...	1.05	.98	...	.92	1.03	.90	.91	1.06	1.02	...	...	...	.92	.93
27-27.9	1.10	1.05	.88	1.11	1.12	...	1.10	1.03	.88	...	...	1.02	...	.96	1.06	.95	.95	1.10	1.06	...	...	...	.95	...
28-28.9	1.14	1.10	.90	1.14	1.15	...	1.14	1.07	.90	...	...	1.06	...	.99	1.10	.99	.99	1.15	1.10	...	...	...	.97	...
29-29.9	1.17	1.15	.93	1.18	1.18	F.O.B.	1.17	1.12	.93	...	...	1.09	...	1.03	1.14	1.03	1.02	1.20	1.14	...	...	...	.99	...
30-30.9	1.21	1.19	.95	1.22	1.21	our	1.21	1.17	.95	F.O.B.	...	...	...	1.07	1.17	1.08	1.06	1.25	1.18	...	...	...	1.01	...
31-31.9	...	...	...	...	1.24	Pipe	1.24	1.22	.97	Ship	...	...	...	1.11	1.21	1.12	1.09	1.29	...	...	...	...	...	...
32-32.9	...	...	...	...	1.27	Line	1.27	1.27	1.00	...	...	...	...	1.14	1.25	1.16	1.13	1.34	...	...	...	...	...	...
33-33.9	...	...	...	...	...	...	...	1.32	...	1.28	...	...	...	1.18	1.28	1.20	1.17	1.38	...	...	...	$1.19	...	...
34-34.9	...	...	...	...	...	...	...	1.37	...	1.32	...	...	...	1.22	1.32	1.25	1.20	...	...	...	...	1.23	...	...
35-35.9	...	...	...	...	...	...	...	1.42	...	1.35	...	...	...	1.25	...	1.29	...	...	...	...	...	1.27	...	...
36-36.9	...	...	...	...	...	...	...	1.46	...	1.39	...	...	...	1.29	...	1.33	...	...	...	...	...	1.31	...	...
37-37.9	...	...	...	...	...	...	...	1.51	...	1.43	...	...	...	1.32	...	1.37	...	...	...	...	...	1.35	...	...
38-38.9	...	...	...	...	...	...	...	1.56	...	...	...	...	...	1.36	...	1.42	...	...	...	...	...	1.39	...	...
39-39.9	...	...	...	...	...	...	...	1.61	...	...	...	...	...	1.40	...	...	...	...	...	...	...	1.43	...	...
40-40.9	...	...	...	...	...	...	...	1.66	...	...	...	...	...	1.43	...	...	...	...	...	...	...	...	...	...

Newhall, McKittrick, Kern River, Kern Front and Round Mountain, 70 cents for all grades. *Posted by Union Oil Co. Same company's Brea Canyon schedule stops at $1.14 for 28 degrees and over, and Belridge and Lost Hills schedule stops at $1.32 for 37 degrees and over. By Standard Oil Co., effective October 15: El Segundo, 14 to 18.9 degrees, 80 cents; 19-19.9, 82 cents; 20-20.9, 85 cents; 21-21.9, 88 cents; 22-22.9, 92 cents; 23-23.9, 95 cents; 24-24.9, 99 cents; 25-25.9, $1.03; 26-26.9, $1.06; 27-27.9, $1.10; 28-28.9, $1.14; 29-29.9, $1.17; 30-30.9, $1.21. Wilmington, 14 to 16.9, 75 cents; 17-17.9, 77 cents; 18-18.9, 79 cents; from 19 degrees upward, prices same as Signal Hill.

Kansas Developments

By
DAL DALRYMPLE

Seek Bloomer Pool Extension in Northwestern Rice County

The Bloomer field held interest of Kansas operators the past week, with completion of a large producer in the south end of the pool in Barton County and the starting of the first attempt to extend the producing area into northeastern Rice County. Four tests now are drilling in the south extension of the field, two in Barton County, one in Ellsworth County and the sole Bloomer test in Rice County. The Rice County extensioner, Gulf Oil Corp. No. 1 Ames, NW cor. Section 6-18-10w, is offset on the north by the new test in Ellsworth County, on the northwest and southwest by new tests in Barton County and on the west by a new Barton County producer. Production in the Habiger pool of Rice County is about three-fourths of a mile east of the No. 1 Ames.

Western Kansas Oil & Refining Co. No. 1 Reiff, SW SW SE Section 35-16-13w, Ainsworth pool extensioner in Barton County, was due for early completion. It had Arbuckle lime at 3,318-21 feet, total depth, oil rose in the hole and operators prepared to test. It is one-half mile northeast of Ainsworth production. Completion of this well as a producer will force three offsets.

Extension of the Laton pool in Rooks County appeared imminent at George Seidhoff and Broadview Oil Co. No. 1 Livingood, SE SE NW Section 11-9s-16w. Oil rose 1,500 feet in the hole from Lansing-Kansas City lime at 3,250 feet, total depth, and operators were underreaming casing preparatory to testing. It is one-fourth mile northwest of the Laton area.

Wildcat Operations

Stearns No. 1 Stellow, NW cor. Section 32-11-14w, wildcat in Russell County, was dry and abandoned at 3,552 feet, total depth, in Wilcox sand.

Stanolind Oil & Gas Co. No. 1 Curtis, SE cor. Section 31-21-12w, Stafford County wildcat, was given up as a bad job and abandoned at 3,640 feet, total depth.

McKnab No. 1 O'Neil, NW NW SE Section 27-32-3e, wildcat in Cowley County, was dry and abandoned at 3,528 feet, total depth.

Joe Nathan No. 1 Ellis, NW NW SE Section 35-25-14, failed to find production and the wildcat was dry and abandoned at 1,611 feet, total depth.

Continental Oil Co. and others No. 1 Gray, SW SE SE Section 26-17-8w, wildcat north of the Edwards pool in Ellsworth County, was a location.

Vickers Petroleum Co. was building rotary rig at No. 1 Blue, C W half NW NW Section 1-33-2w, wildcat in Sumner County.

Cox & McGinnis and Saco Oil Co. No. 1 Jolliffe, C S half SW SE Section 2-22-5e, Marion County wildcat, was a machine.

M. J. Trott was drilling below 350 feet at No. 1 Abbott, NW NE NE Section 21-25-14, wildcat in Woodson County.

I. W. Murfin and others No. 1 Birzer, NE NE SW Section 21-19-11w, wildcat in Barton County, had spudded and shut down.

Stafford County

E. H. Moore, Inc., completed another big producer in the Zenith field, Stafford County, at No. 3 O'Haver, NE SW SW Section 13-24-11w. It was completed for potential of 3,150 bbls. of oil from Misener sand at 3,808 feet, total depth.

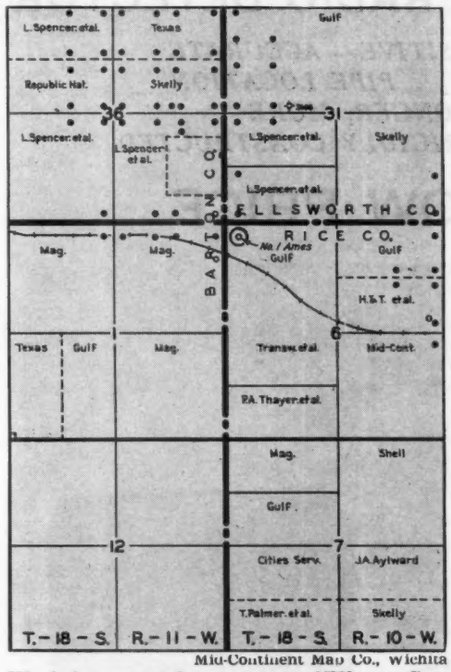
Derby Oil Co. No. 4 McComb, NW cor. Section 24-24-11w, topped Misener sand pay at 3,800 feet, was bottomed at 3,820 feet, and was completed for potential of 3,640 bbls. of oil.

Stanolind Oil & Gas Co. No. 6 Volker, NE NW NE Section 23-24-11w, had sand at 3,812 feet, was bottomed at 3,835 feet, and was rated potentially at 1,909 bbls. of oil.

Pure Oil Co. No. 1 Krey, SE NE SE Section 14-24-11w, was completed at 3,809 feet, total depth, flowed 112 bbls. of oil the first four hours and was given potential of 1,833 bbls. Gas gauged 1,000,000 feet.

J. E. Crosbie, Inc., No. 1 Johnson, SW NW SW Section 13-24-11w, had Misener sand at 3,796 feet, total depth 3,817 feet, flowed 100 bbls. of oil in four hours and made potential of 667 bbls.

New work in Stafford County: Indian Territory Illuminating Oil Co. No. 1 Mellies, SW SW NW Section



Mid-Continent Map Co., Wichita

Work has started at a test in NW cor. Section 6-18-10w, in an effort to extend the Bloomer pool into Rice County

36-21-12w, moving in material; Magnolia Petroleum Co. No. 3 Mattie Gaes, NW NE NE Section 34-21-13w, rigging up rotary; J. E. Crosbie, Inc., No. 3 Johnson, SW NE SW Section 13-24-11w, rigging up rotary.

Rice County

Continental Oil Co. No. 6 Groth, NW NE SW Section 32-20-7w, Wherry district, Rice County, topped conglomerate at 3,315 feet, total depth 3,330 feet, flowed 307 bbls. of oil the first four hours, 314 bbls. the next four hours and made potential of 1,839 bbls. of oil, with no water.

L. E. Douglass Oil & Gas Co. No. 1 Engelland, NW NE SW Section 15-21-7w, swabbed 67 bbls. of oil the first four hours, 55 bbls. the next four hours and made potential of 248 bbls. Top of conglomerate at 3,370 feet, total depth 3,384 feet.

Continental Oil Co. No. 2 Williams, SE NE NW Section 13-18-8w, Geneseo district, topped Arbuckle lime at 3,168 feet, total depth 3,215 feet, and made potential of 2,519 bbls. of oil daily.

Sinclair Prairie Oil Co. No. 1 Radenberg, SE SE NW Section 8-18-10w, was dry and abandoned at 3,305 feet, total depth.

Five new tests were reported in Rice County, as follows: Gulf Oil Corp. No. 1 Ames, NW cor. Section 6-18-10w, which will extend the Bloomer field into Rice County if it is a producer, was a cellar; Frank Hollow and others No. 1 Beck, SE SE SW Section 6-18-10w, location; Continental Oil Co. and others No. 6 Wood, SW SE SE Section 12-18-8w, building rotary rig; same operators' No. 3 Bolton, NE NE NW Section 31-18-7w, rotary rig; Shell Petroleum Corp. No. 8 Zajic, SW SW NE Section 13-18-8w, building rotary rig.

Frank Hollow No. 2-A Stout, SE SE NE Section 6-18-10w, found pay at 3,225 feet, total depth 3,227 feet, pumped 320 bbls. and 341 bbls. of oil in respective four-hour tests, making potential of 1,925 bbls. of 42-gravity oil.

Russell County

Skelly Oil Co. No. 3 Opdycke, SW SW NW Section 29-14-13w, Russell County, was bottomed at 3,243 feet, plugged back to 3,180 feet, pumped 91 bbls. and 72 bbls. of oil in four-hour tests and made potential of 429 bbls.

Stanolind Oil & Gas Co. No. 2 Rein, SE NW NW Section 25-14-14w, was completed at 3,252 feet, pumping 71 bbls. of oil and 18 bbls. of water the first four hours, 57 bbls. of oil and 37 bbls. of water the next four hours, and made potential of 438 bbls. of oil.

Continental Oil Co. No. 1 Billings, NW NW SW Section 32-14-14w, was dry and abandoned at 3,180 feet total depth.

First reports of new Russell County activity: Texon No. 6 Letsch, NW NE SW Section 26-14-13w, building rotary rig; Skelly Oil Co. No. 4 Opdycke, NE NE NW Section 32-14-13w, location; Shell Petroleum Corp. No. 1 Major, SW SW NE Section 4-15-12w, location; Signal Oil Co. No. 1 Bangart, NE NW NW Section 2-18-14w, drilling below 2,135 feet.

Barton County

Spencer & Yarnell No. 7 Patzner A, SW SE SE Section 36-17-11w, Bloomer field, Barton County, found Arbuckle lime at 3,241 feet, was bottomed at 3,244 feet and made initial potential of 2,946 bbls. of oil.

Gulf Oil Corp. No. 4 Sessler, SE NW SW Section 24-20-11w, an old well in the South Silica field, was deepened and completed as a water disposal well at 3,812 feet.

Atlantic Refining Co. No. 1 Soderstrom, NE NE SW Section 21-17-13w, Hoisington area, was temporarily abandoned at 3,446 feet, total depth.

New work in Barton County: Magnolia Petroleum Co. No. 5 Mueller, SE NE NE Section 1-18-11w, was a cellar; it is the farthest south test in the Bloomer field and will extend that sector one location if completed as a producer; Continental Oil Co. No. 2 Ford, NE NE NW Section 10-17-13w, building rotary rig; Westgate-Greenland Oil Co. and others No. 1 Seyfert, SW NW NE Section 3-17-13w, moving in material.

McPherson County

Continental Oil Co. No. 3 Boochner, NE NE SE Section 29-21-1w, Graber pool, McPherson County, topped Hunton lime at 3,314 feet, total depth 3,334 feet, pumped 108 bbls. of oil the first four hours, 96 bbls. the next four hours and made potential of 577 bbls.

Same company's No. 4 Boechner A, NW NW SW Section 28-21-1w, was building rotary rig.

Ellis County

Murphy Oil Co. No. 2 Rumsey, SE NW SW Section 23-11-17w, Ellis County; topped Arbuckle lime at 3,374 feet, total depth 3,384 feet, pumped 338 bbls. of oil the first four hours, 408 bbls. the next four hours and made potential of 2,373 bbls. of 35-gravity oil.

Kerlyn Oil Co. No. 6 Rumsey, NW SE SW Section 23-11-17w, pumped 412 bbls. and 432 bbls. in successive four-hour tests, making potential of 2,469 bbls. Top of Arbuckle lime was 3,469 feet, total depth 3,473 feet.

Ryan Consolidated Co. No. 5 Bemis C, NW SE SW

Section 21-11-17w, Bemis field, found Arbuckle lime at 3,446 feet, total depth 3,455 feet, and made potential of 58 bbls. of oil daily.

Three new tests were reported in Ellis County. Shell Petroleum Corp. No. 13 Rumsey, NE NE NW Section 23-11-17w, rotary rig; Darby Petroleum Corp. No. 3 Jorgensen, NW SW SW Section 7-11-17w, moving in material; same company's No. 1 Henderson, SE SE NW Section 7-11-17w, rotary rig.

Harvey County

Olson Oil Co. and Shell Petroleum Corp. No. 4 Krehbiel & Eymann, NE NE SW Section 19-23-3w, Burrton field, Harvey County, found pay at 3,260 feet, total depth 3,361 feet, pumped 105 bbls. of oil and 125 bbls. in successive four-hour tests, making potential of 629 bbls.

A. A. Thornton No. 1 Morris, NW cor. Section 32-23-3w, was dry and abandoned at 3,371 feet, total depth.

Rush County

Aylward No. 1 Schlegel, C NE SW Section 1-18-16w, Otis field, Rush County, was dry and abandoned at 3,560 feet, total depth.

Reno County

Shell Petroleum Corp. No. 2 Nunemaker, SW NW NE section 11-26-9w, Lerado field, Reno County, was bottomed at 4,156 feet, plugged back to 4,068 feet, and produced 1,300,000 feet of gas.

Greenwood County

Oko Oil Co. No. 11 McNeil, C NE SW Section 22 23-13, Greenwood County, found Bartlesville sand at 1,553 feet, total depth 1,593 feet, and pumped 20 bbls. of oil daily.

Houston-Oklahoma Oil Co. No. 8 Berry, C SW Section 28-23-13, North Vergil area, had Burgess sand at 1,749 feet, total depth 1,753 feet, and pumped 15 bbls. of oil daily.

Shull Drilling Co. No. 1 Long, SW SE NE Section 17-23-13, found Mississippi lime at 1,753 feet, total depth 1,771 feet, and pumped 20 bbls. of oil daily.

Allen & Lewis No. 6 Grundy, Section 7-27-11, Climax area, had lime at 1,884 feet, total depth 1,889 feet, and pumped 30 bbls. of oil daily.

Sam Molter No. 1 Lewis, NE SW NW Section 36-27-8, Beaumont pool, swabbed 43 bbls. of oil daily from Peru sand at 1,816 feet, total depth 1,848 feet.

Weideman No. 2-B Lewis, NW SE SW Section 25-27-8, had pay at 1,823 feet, was bottomed at 1,844 feet, and swabbed 15 bbls. of oil daily.

Duncan and others No. 6 Scheidler, NW NW SW Section 16-23-13, was a cellar.

Woodson County

C. L. Sheedy No. 11 Akins, C W half SE SE Section 19-25-14, Woodson County, had Bartlesville sand at 1,400 feet, total depth 1,460 feet, and pumped 15 bbls. of oil daily.

Prairie States Core Drilling Co. No. 1 Armstrong, SE NE SE Section 20-23-15, was dry and abandoned at 1,560 feet, total depth.

Nye & McCormick No. 3 Kimbell, NE SW SW Section 18-24-14, was a machine. Sinclair Prairie Oil Co. No. 9 McClaskey, SE SE NW Section 29-23-14, an old well being deepened, was drilling below 2,089 feet.

Butler-Cowley Counties

Rex & Morris No. 1 Farmer, SE cor. Section 22-28-7, Butler County, was dry and abandoned at 2,867 feet, total depth.

The following new work in Cowley County was reported: E. B. Shawver and others No. 3 West Newton, SW SE NW Section 15-30-4, rotary rig; Arthur Brewer No. 1 Joslyn, NW SE SW Section 16-30-4, moving in material; Earl Wakefield No. 2 Hanna, SE NE SW Section 2-31-4, moving in material.

Grant County

United Production Co. No. 1 Lowe, SW SW NE Section 35-29-35w, Hugoton gas field, Grant County, was bottomed at 2,720 feet and produced 7,700,000 feet of gas daily.

Other New Work

In Sedgwick County, Harwood Oil Co. No. 1 Shockey, NE NE SW Section 32-28-2e, was moving in material. Prunty Production Co. No. 3 Rausch A, NE SW SE Section 16-25-1e, was a rotary rig.

In Coffey County, Ward McGinnis No. 1 Peak, SW SW SE Section 16-23-15, was drilling below 200 feet.

Estimated Daily Production

Estimated daily production for Kansas for the week ending September 17, and for the preceding week, was as follows:

	Barrels	
	Sept. 17	Sept. 10
Oxford City	1,200	1,225
Burrton	9,525	9,400
Ritz-Canton	4,375	4,300
Graber	3,300	1,475
Hollow-Nikkel	3,050	3,025
Lerado	875	750
Voshell	1,950	1,975
Wellington	2,725	3,200
Ellsworth County:		
Lorraine	1,800	1,825
Other pools	1,335	805
Rice-Barton counties:		
Bloomer	3,375	1,675
Chase	4,150	4,350
Geneseo	4,175	2,475
Raymond	1,200	750
Silica	11,350	6,950
South Silica	1,875	1,950
Keesling	650	700
Wherry	3,700	2,675
Miscellaneous Barton	6,570	6,560
Miscellaneous Rice	3,465	4,225
Russell County:		
Fairport	1,980	1,670
Gorham	1,605	2,080
Russell	1,130	1,035
Sullivan	5,085	4,170
Trapp	8,210	8,020
Miscellaneous Russell	7,905	7,085
Sedgwick County:		
Valley Center	950	1,050
Miscellaneous	2,980	2,870
Ellis County:		
Bemis	5,500	5,800
Miscellaneous	3,290	3,315
Kingman County	610	460
Stafford County	4,230	3,100
Greenwood County	9,300	9,275
Butler County	18,150	17,650
Other fields	25,480	26,405
Total Kansas	167,050	154,300

Eastern Fields

(Continued from Page 248)

the John Ash farm in Centerville district, elevation 941 feet. In Upshur County, Paul K. Weekley will drill on the E. J. Smallridge farm, in Banks district, elevation 2,033 feet. In Wirt County, the Richter Oil Co. will drill on the M. Richter farm in Burning Springs district.

NEW MODEL ELI PIPE LINE RADIO DETECTOR

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Transmitter weighs 10 pounds. It is connected to pipe line by means of ground spears furnished. It supplies the signal and permits adjustment for high conductivity soil (salt marsh, etc.) or low conductivity soil (dry sand) with equal efficiency. Accurate line locations within two inches is possible and depth determinations can be made within 10% of true depth.

TRANSMITTER AND RECEIVER COMPLETE WITH SPEARS, LEADS, BATTERIES, HEAD PHONES, TOOLS, AND CANVAS CASES

***AT THE NEW* LOW PRICE $125.00 COMPLETE**

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KENNEDY BUILDING

TULSA, OKLAHOMA, U. S. A.

Texas and Louisiana Gulf

By NEIL WILLIAMS

Ohio Oil Company Opens Its First Pool on the Texas Coast

HOUSTON, Tex., Sept. 19.—Ohio Oil Co. marked up its first discovery in the Gulf Coast district with the completion of No. 1 W. D. Cornelius, 2½ miles north of Markham, Matagorda County. The well was washed in through perforated casing at 7,727-30 feet, and during the last 12-hour gauge ending at 7 a.m. September 15, it flowed 170 bbls. of fluid, of which 85 per cent was 34-gravity oil, and the balance basic sediment and water. While the well was cleaning, it was reported that the water had a brackish taste, but on a reduced choke late in the week the flow was reported to be free of salt water. It is flowing into the tanks through a three-sixteenths inch choke, with tubing pressure 950 pounds and casing pressure 1,350 pounds. Production is from the Basal Frio section, topped at 6,800 feet, and cored to a total depth of 7,760 feet, after establishing the salt water level at 7,740 feet.

The discovery is located on a block of several thousand acres centering in the P. C. Yarbrough Survey. Several major companies have protection acreage near the well.

Harris County

Production from a deeper sand in the Eureka field, Harris County, was practically established by the showing in Jack Frazier No. 1 Laura Lackner, 1,500 feet northwest of production. Casing was perforated at 8,085-95 feet, and the well flowed an estimated 25 bbls. of fluid per day, of which 14 per cent was brackish water and the balance 50-gravity oil. It is flowing through a quarter-inch choke, tubing pressure 1,550 pounds and casing pressure 1,990 pounds. The salt water content is reported to have shown an increase at the close of the week, and the well is expected to be recompleted. While the producing section has not been definitely identified it is thought to be the Mt. Selman or Cook Mountain horizon. The main pay is from the Yegua at approximately 7,700 feet.

Two extensions in the field brought production within a few hundred feet of the Houston city limits. J. A. Frazier No. 2 Helberg topped the sand at 7,693 feet, and the hole was cored to a total depth of 7,738 feet, where a production test is being made. This is the most southwesterly producer in the field in the J. Reinerman Survey. On the northeast edge of production, Means & McGehee No. 1-D Laura Lackner extended the field into the Shady Acres subdivision adjoining the Houston city limits, as a production test is being made after a good sand section, showing oil, was cored.

Extend Fairbanks Field

The Fairbanks field, Harris County, was extended approximately 1,500 feet to the northeast by D. A. Moore and others No. 1 Whitehead and Rash. Gas sand was topped at 6,810 feet, and oil sand topped at 6,839 feet was cored to a total depth of 6,853 feet. Casing was cemented on bottom and the well is reported to be flowing into the tanks, although no gauge was available. This test was placed in the doubtful class shortly after it was started in view of a dry hole drilled by Williams & Thompson on the Kramer lease, about 1,500 feet to the northwest. In the Rosslyn area, 4,000 feet east of production, Stanolind Oil & Gas Co. No. 1 Schumacher was coring broken sand with a slight gas odor at 6,940 feet. This well is a few hundred feet north of the same company's No. 1 Fritz Look, completed two weeks ago in a new sand below 6,900 feet.

Sun Oil Co. is completing No. 2 Houston Farm Development Co. as a gas well which opens the way for additional development in an area 2 miles southeast of the Greens Lake field, Harris County. Screen and liner were set after casing was perforated at 6,808-18 feet and the well is flowing a small amount of distillate and an unestimated amount of gas through a one-eighth inch choke, with tubing pressure 2,300 pounds and casing pressure 2,300 pounds.

Segno Field

Gulf Oil Corp. added a second producer to the deep sand in the Segno field, Polk County, with the completion of No. 12 Wing through perforated casing at 8,111-18 feet. The well flowed 653 bbls. per day through a quarter-inch choke. It is southeast of No. 2 Reagan, the discovery producer in the I.&G.N. Survey No. 14. Interest in the deep development is now centered on Humble Oil & Refining Co. No. 9-B Kirby Lumber Co., 2 miles to the east in the I.&G.N. Survey No. 14. This test showed evidence of production last week in the deep pay, but was drilled to 8,736 feet before 7-inch casing was cemented at 8,200 feet.

Montgomery Wildcats

Wildcatting activities in Montgomery County continue to show an increase as locations for two more wells were announced. Mills Bennett Production Co. staked location for No. 1 Victoria Griffin in the Archibald League, on what is known as the Honea prospect. It will be drilled in search of the deep pay found in the Segno and Spurger fields. About 5 miles east of New Caney, in the D. Garrett Survey, J. W. Frazier is moving in material for No. 1 Chase National Bank of New York, a projected 8,500-foot hole.

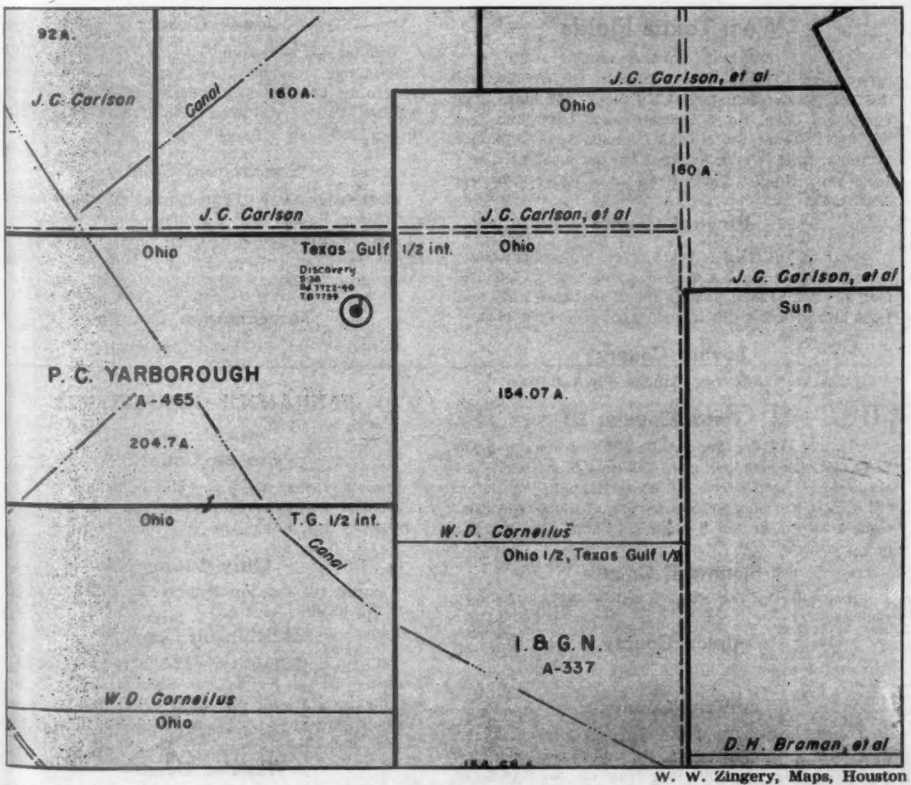
Locations for two more important wildcats were reported for Jackson and Colorado counties. Several miles south of the town of Francitas, Jackson County, Texas Co. is moving in material for No. 1 J. F. Weed in the John D. Newell Survey No. 61, while in Colorado County E. E. Rosaire and others have made location for a 7,500-foot Wilcox sand test on the J. M. Truchard lease in the Edward Corbit Survey.

In the Labelle Field

In the Labelle field, Jefferson County, Sun Oil Co. is running casing in No. 4 Broussard, which is bottomed at 8,675 feet. Sand and shale showing gas was cored at 8,595-8,610 feet, and sand showing gas at 8,610-40 feet. This well is southeast of No. 3 Broussard, which blew out several weeks ago from approximately the same depth. No. 4 Broussard was originally planned to be a directional hole, but the hole was drilled vertically in the hope that by producing from the same sand the gas pressure in No. 3 Broussard would be relieved, making it possible to cap the well without drilling a directional hole. Should this procedure fail, No. 4 Broussard will be plugged back and the hole sidetracked for directional purposes.

Another drilling boom is getting underway in the Orange field, following the completion of Red Bank Oil Co. No. 1 Michel, a new sand discovery on the northwest flank, which flowed an estimated 22 bbls. of oil per hour from perforated casing at 5,569-75 feet. Locations for three offsets were made and the same company is moving the rig southwest for No. 3 Michel. Continental Oil Co. has let contract for No. 1 Oscar Chesson, a northeast offset, while Gulf Oil Corp. is starting a south offset on fee acreage. Ryan & Andrews made a location for No. 1 F. T. Peveto in the William Dyson Survey, about 2,100 feet south of the new producer.

Approximately a half mile southwest of the old Spindletop field, Jefferson County, British American



W. W. Zingery, Maps, Houston

Ohio Oil Co. No. 1 Cornelius, completed last week as the discovery well of a Frio sand pool in Matagorda County

Oil Co. and others are starting drilling operations on a projected deep test located on the Gladys City 275-acre tract in the J. A. Veatch Survey.

Coastal Louisiana

Extensions to two fields and the announcement of several important wildcat locations, were the outstanding developments in the Coastal Louisiana district.

William Helis No. 1 Harry B. Nelson, Section 36-7s-1w, extended the Baton Rouge field, East Baton Rouge Parish, 1,600 feet southeast, as the well is flowing an unestimated amount of oil and wash water under a tubing pressure of 715 pounds and casing pressure 800 pounds. The well is bottomed in a sidetracked hole at 6,480 feet with 7-inch casing cemented at 6,422 feet.

The Woodlawn field, Jefferson Davis Parish, was extended a half mile eastward by Union Sulphur Co. No. 1 Miller, Section 7-9s-5w. Casing was perforated at 8,911-15½ feet, and the well is flowing at the rate of 375 bbls. per day through a three-sixteenths inch choke under a working pressure of 2,400 pounds. This is the third producer for the field and it is structurally higher than the other two wells which are small producers, due to high gas-oil ratio and salt water encroachment.

In the Lafitte field, Jefferson Parish, Texas Co. extended the field several hundred feet with the completion of No. 3 Madison Realty Co. Bottomed at 10,155 feet, production was obtained by perforating the casing at 10,086-10,106 feet, and the well flowed 1,388 bbls. per day through a three-eighths inch choke.

Deep Test a Failure

Humble Oil & Refining Co. No. 36 Orleans, a deep test on the Potash dome, Plaquemines Parish, has been abandoned at 10,027 feet. Broken sections of sandy shale and sand having slight oil odors were cored at intervals from 9,920 feet to the total depth. This is the first attempt to open deep production on this shallow dome.

On the west flank of the Valentine dome, Lafourche Parish, William Helis completed his second producer in the deep sand which he opened three weeks ago. No. 3 Valentine Sugars cored oil sand at 7,372-87 feet and was completed for an initial production of 25 bbls. per hour through a quarter-inch choke. The hole is bottomed at 7,403 feet with 7-inch casing cemented at 7,374 feet.

Gulf Oil Corp. No. 4 State, the second well to be drilled in the Timbalier Bay field, Lafourche Parish, is shut down waiting on orders after topping rock salt at 7,224 feet and drilling to 7,268 feet. The well is southwest of the discovery well and has cored several sands showing oil below 5,100 feet.

Dry Hole in Villa Platte

The southern limits of the Villa Platte field, Evangeline Parish, were defined with the abandonment of J. K. Hughes No. 1 J. E. Ortego, Section 36-3s-2e. The well is located about 2,500 feet south of production and was quit at 9,166 feet. The Sparta was topped at 8,690 feet and the sand section in the discovery horizon is reported to have shown some saturation, but carried salt water.

Locations for five wildcats were reported, three of which are located in Acadia Parish, one in Beauregard Parish and one in Lafourche Parish. P. D. Freeman is starting a second test on the J. E. Settig lease in Section 17-7s-1w, Acadia Parish. Tri-Parish Drillers, Inc., have derrick up for No. 1 Paul Stag, in Section 4-7s-1w, while Western Gulf Production Co. made location for No. 1 Homeseekers Development Co. in Section 16-10s-1w. In Beauregard Parish, Humble Oil & Refining Co. is starting a deep core test on the Powell Lumber Co. lease in Section 25-3s-8w.

On the Catfish Lake prospect, Lafourche Parish, Texas Co. No. 1 Stake Catfish Lake is located in Section 77-19s-21e. This is the second wildcat location to be made by the company in this parish, as No. 1 La Terre, Golden Meadows prospect, Section 1-20s-21e, is drilling in sand with no shows below 9,874 feet.

COMPLETIONS ON TEXAS COAST

(24-hour production)

Brazoria County

Hastings field: Stanolind Oil & Gas Co. No. 26 Steve Paul, perforated casing 5,769-73 feet, 574 bbls., quarter-inch choke. Stanolind Oil & Gas Co. No. 8 Autrey, perforated casing 6,056-78 feet, 472 bbls., quarter-inch choke. Manvel field: Dearing and others No. 1 Anderson, 4,077 feet, abandoned. West Columbia field: Frost & Dunman, 5,357 feet, 566 bbls., quarter-inch choke. M. Hogg No. 3 Hogg Estate, sand 5,413-21 feet, 13 bbls. per hour, three-sixteenths inch choke. Texas Co. No. 25 W. H. Abrams, sand 5,243-5,311 feet, 476 bbls., quarter-inch choke.

Chambers County

Anahuac field: Gulf Oil Corp. No. 2 D. W. Syphrett, sand 7,133-38 feet, 154 bbls., quarter-inch choke. Humble Oil & Refining Co. No. 20 Gripon, 7,125 feet, 360 bbls., quarter-inch choke; No. 21 G. C. Johnson, 7,095 feet, 672 bbls., quarter-inch choke.

Fort Bend County

Thompson field: Humble Oil & Refining Co. No. 34-B Lockwood, 3,467 feet, 1,500,000 feet of gas.

Harris County

Clear Lake field: West Production Co. No. 1-A West, sand 5,895-5,979 feet, 605 bbls., quarter-inch choke. Fairbanks field: Amerada Petroleum Corp. and Stanolind Oil & Gas Co. No. 2 Silberg, perforated casing 6,845-50½ feet, 427 bbls., quarter-inch choke. Amerada Petroleum Corp. No. 2 Marietta, perforated casing 6,838½-42½ feet, 326 bbls., quarter-inch choke. Carroll Oil Co. No. 1 Ralph Johnston, perforated casing 6,839-42 feet, 45 bbls. oil fluid per day, 2 per cent salt water, pumping. Stanolind Oil & Gas Co. No. 1 Fritz Look, perforated casing 6,947-56 feet, 251 bbls. oil and 39 bbls. salt water, quarter-inch choke. Friendswood field: Humble Oil & Refining Co. No. 19 LeBleu, sand 6,033-60 feet, 629 bbls., quarter-inch choke; No. 5 Keisling and Dixon, sand 5,953-47 feet, 677 bbls., quarter-inch choke; No. 2 J. D. Owens, sand 5,727-6,048 feet, 593 bbls., quarter-inch choke; No. 3-B Whitcomb, sand 5,883-6,047 feet, 648 bbls., quarter-inch choke. Tomball field: Humble Oil & Refining Co. No. 2 Michel, perforated casing 5,569-72 feet, 500 bbls., quarter-inch choke.

Jefferson County

Amelia field: Stanolind Oil & Gas Co. No. 4 Hall, 5,888 feet, abandoned. Spindletop field: Stanolind Oil & Gas Co. No. 150 McFaddin, perforated casing 3,634-54 feet, 270 bbls., quarter-inch choke.

Liberty County

Hardin field: Atlantic Refining Co. No. 2 C. R. Wilson, perforated casing 7,593-97 feet, 210 bbls., quarter-inch choke.

Matagorda County

Van Vleck field: Skelly Oil Co. No. 3 Johnson, sand 8,221-45 feet, 298 bbls., 16 hours, three-sixteenths inch choke.

West Texas Fields

(Continued from Page 259)

Scharbauer, 4,173-4,225 feet, 800 bbls. Oil Well Drilling Co. No. 8-A Cowden, 4,075-4,216 feet, 1,387 bbls. Shell Petroleum Corp. No. 5-A Scharbauer, 4,168-4,213 feet, 753 bbls.; Texas Co. No. 23 Connell, 3,448-3,670 feet, 513 bbls. L. H. Wentz No. 12-D Parker, 4,055-4,163 feet, 1,882 bbls.; No. 7-A T.&P. Land Trust, 4,010-4,138 feet, 2,433 bbls.

Howard County

Eastland Oil Co. No. 2-A Snyder, temporarily abandoned location; No. 2-A T. & P. Land Trust, 2,580-2,760 feet, 908 bbls. Lloyd Noble No. 6 Chalk, 2,903-3,029 feet, 1,685 bbls.; No. 2-A Chalk, 2,881-3,050 feet, 1,530 bbls.

Loving County

Evans No. 1 Johnson, abandoned at 3,214 feet.

Pecos County

Cardinal Oil Co. No. 2-A-37 White & Baker, 1,606-1,640 feet, 2,000,000 feet gas. Childress Realty Co. No. 2 Masterson, 1,415-38 feet, 170 bbls. Magnolia Petroleum Co. No. 1-A Tex-Mex-McKee, dry and abandoned at 6,267 feet. Two States No. 3 Magnolia Petroleum, 1,821-62 feet, 280 bbls.

Stonewall County

Stonewall Oil Co. No. 1 Carlisle, 5,172-5,176 feet, 150 bbls.

Upton County

Cordova-Union No. 9-A fee, 2,067-85 feet, 299 bbls.

Ward County

J. E. Fitzpatrick No. 1 H. V. Carr, dry and abandoned at 5,208 feet. Gulf Oil Corp. No. 103 Estes, 2,440-2,630 feet, 1,657 bbls. Magnolia Petroleum Co. No. 8-46 Sealy, 2,775-2,850 feet, 329 bbls. Peerless Oil & Gas No. 1 F. M. White, dry and abandoned at 2,276 feet. H. I. Waid No. 2 Brown Heirs, 1,819-73 feet, 313 bbls. F F. White No. 1 Rector-Monroe, temporarily abandoned at 4,710 feet.

Winkler County

Humble Oil & Refining Co. No. 13-D Walton, 2,780-2,994 feet, 607 bbls. Magnolia Petroleum Co. No. 175 J. B. Walton, 3,215-70 feet, 514 bbls.; No. 177 Walton, 2,820-2,917 feet, 476 bbls.; No. 178 Walton, 2,830-2,910 feet, 2,129 bbls.; No. 181 Walton, 2,827-2,945 feet, 1,364 bbls. Samwan Oil No. 1 R. D. Kessler, temporarily abandoned location.

Yoakum County

Magnolia Petroleum Co. No. 3 Bennett, 5,040-5,240 feet, 1,886 bbls. Shell Petroleum Corp. No. 4 Dowden, total depth 5,063 feet, 376 bbls.

WEST CENTRAL TEXAS COMPLETIONS

(24-hour tests)

Brown County

W. D. Cunningham No. 1 Harris & Pitman, 1,874-99 feet, 300 bbls. Delmarva Oil Corp. No. 1 G. T. Butler, dry and abandoned at 1,351 feet. Glicrease Oil Co. No. 5 J. M. Perry, 1,328-45 feet, 13 bbls.

Callahan County

Dr. R. R. Morden No. 1 J. M. Isenhower, 270-80 feet, 3 bbls. L. E. Price-Van Zandt No. 1 J. L. Sikes, 288-96 feet, 2 bbls. Walker & Braman No. 1 Clark, dry and abandoned at 750 feet.

Comanche County

R. D. Compton No. 1 Griffin, dry and abandoned at 2,505 feet.

Eastland County

Reeves No. 3 Downtain, 1,491-1,501 feet, 15 bbls.

Erath County

McGee Development Co. No. 1 T. W. Robertson, dry and abandoned at 3,216 feet.

Fisher County

Montour Production Co. No. 2 W. L. Barker, temporarily abandoned at 944 feet. Owens & Snebold No. 1 Millsap, dry and abandoned at 3,590 feet. Magnolia Petroleum Co. No. 3 Smith, 3,482-96 feet, 325 bbls.

Haskell County

Indian States Oil Co. No. 1 L. W. Jones, dry and abandoned at 4,208 feet.

Jones County

Humble Oil & Refining Co. No. 13 J. W. Hellums, 3,238-44 feet, 467 bbls. Iron Mountain Oil-Humble Oil & Refining Co. No. 4 O'Lander, total depth 3,183 feet, 753 bbls. Petroleum Production Co. No. 8 Millsap, 1,921-40 feet, 289 bbls.

Shackelford County

Charter Oil Co. No. 1 Sedwick, dry and abandoned at 418 feet. Hammond and others No. 3-D Lee, 1,054-57 feet, 20 bbls. Gee & Key No. 1 Sanders, 443-51 feet, 50,000 feet gas. Pemeta Oil Co. No. 13 McCasland, 718-19 feet, 10 bbls.

Throckmorton County

Target Drilling Co. No. 1 E. W. Hunt, dry and abandoned at 5,022 feet.

PANHANDLE COMPLETIONS

(24-hour tests)

Carson County

Haze & McGill No. 5 E. Cooper B, 3,020-3,120 feet, 488 bbls. Washoma Petroleum Co. No. 1 Percival, 2,481-2,585 feet, 81,928,000 feet of gas.

Gray County

Texwell Oil Co. No. 1 O. N. Frashier, 3,175-3,229 feet, 545 bbls.

Hutchinson County

Gulf Oil Corp. No. 84 Dial, 2,815-2,995 feet, 520 bbls. Kewanee Oil Co. No. 2 Lewis-Timms, 2,953-3,056 feet, 366 bbls. Cy Rieger No. 2 R. F. Graves, 3,130 feet, 575 bbls. Travelers Oil Co. No. 6 W. B. Haile B, 3,020-50 feet, 868 bbls.

Wheeler County

Remo Royalty Co. No. 2 George Admire A, junked and abandoned at 2,215 feet.

WILDCAT OPERATIONS

CALIFORNIA

IMPORTANT WELLS AND NORTHERN CALIFORNIA WILDCATS

Company, well, location, and county—	S. T. R.	Depth	Status—
Shell Oil, No. 1-29 Covarrubias, Capitan, Santa Barb.	32- 5-30	1,500	O.S. drlg.
Hancock-Bush, No. 3 Bradley, Santa Maria, S. Barb.	26-10-34	4,781	sd. sh. drlg.
Union Oil, No. 4 Vicente, Santa Maria, Santa Barb..	21-10-34	4,765	sd. sh. drlg.
Union Oil, No. 2 Security, Santa Maria, Santa Barb..	22-10-34	3,960	sd. sh. drlg.
O'Donnell, J. E., No. 1 Helen, Lompoc, Santa Barb.	8- 7-33	4,060	sd. sh. drlg.
Barnsdall Oil, No. 5 Magenheimer, Gato Ridge, S. B.	9- 8-32	3,035	idle
Barnsdall Oil, No. 1 Tezzoni, Gato Ridge, Santa Barb.	15- 8-32	2,196	sd. sh. drlg.
Petrol Corp., No. 511 Magenheimer, Gato Ridge, S. B.	9- 8-32	4,714	br. sh. drlg.
Oceanic Oil, No. 1 Santa Barbara Mesa, Santa Barb.	28- 4-27	3,678	tested wet
High Mesa Oil, No. 1 Butcher, Ojai, Ventura	16- 4-22	1,691	idle
Holly Dev. Co., No. 1 Macrate, Ojai, Ventura	27- 4-23	4,786	may resume
Ventura Drlg., No. 1, Ojai, Ventura	10- 3-23	350	fish. tools
Texas Co., No. 5 Yale, South Mountain, Ventura	13- 3-21	6,698	hd. sd. drlg.
Merchants Pet., No. 1, Sespe, Ventura	1- 4-20	987	O.S. drlg.
St. Louis Oil, No. 1 Williamson, Sespe, Ventura	1- 4-20	570	hd. sh. drlg.
Section 20 Oil, No. 1, Sespe, Ventura	20- 5-19	2,150	sd. sh. drlg.
McKinnis, C. R., No. 1, Hopper Canyon, Ventura	14- 4-19	820	cleaning out
Texas Co., No. 135 Shiells, Shiells Canyon, Ventura	4- 3-19	2,987	sd. sh. drlg.
Continental Oil, No. 9 Grubb, San Miguelito, Ventura	24- 3-24	5,905	O.S. drlg.
Ridge Oil, No. 1 Fox, Padre Canyon, Ventura	9- 3-24	4,495	sd. sh. drlg.
C. C. M. Oil, No. 7 Oakgrove, Padre Canyon, Ventura	23- 3-24	5,674	gr. sd. drlg.
C. C. M. Oil, No. 23-B Hobson, Rincon, Ventura	8- 3-24	1,651	sd. sh. drlg.
Richfield Oil, No. 5-F State, Rincon, Ventura	17- 3-24	3,756	sd. sh. drlg.
Tide Water A. O., No. 111 Lloyd, Ventura Ave., Vent.	27- 3-23	10,050	sd. sh. drlg.
Tide Water A. O., No. 126 Lloyd, Ventura Ave., Vent.	23- 3-23	1,380	sd. sh. drlg.
Tide Water A. O., No. 127 Lloyd, Ventura Ave., Vent.	27- 3-23	9,360	sd. sh. drlg.
Tide Water A. O., No. 134 Yloyd, Ventura Ave., Vent.	27- 3-23	8,378	P.B. 9,295
Tide Water A. O., No. 7 Hartman, Ventura Ave., Vent.	22- 3-23	7,970	sd. sh. drlg.
Tide Water A. O., No. 11 McGonigle, Vent. Ave., Vent.	23- 3-23	9,660	hd. sd. drlg.
Shell Oil, No. 96 Taylor, Ventura Ave., Ventura	28- 3-23	7,390	redrlg. 7,090
Shell Oil, No. 30 Edison, Ventura Ave., Ventura	20- 3-23	6,850	cleaning out
Shell Oil, No. 31 Edison, Ventura Ave., Ventura	20- 3-23	8,447	O.S. drlg.
General Pet., No. 16 Barnard, Ventura Ave., Vent.	21- 3-23	5,449	will deepen
Lloyd Corp., No. 2 Dabney-Lloyd, Vent. Ave., Vent.	23- 3-23	5,531	sd. sh. drlg.
Gibson Oil, No. 3 Alferitz, Devils Den, Kern	14-25-18	1,098	hd. sd. drlg.
Cal. Lands, Inc., No. 1 Occidental, Lost Hills, Kern	24-26-20	4,299	sd. sh. drlg.
Belridge Oil, No. 27-13, North Belridge, Kern	27-27-20	6,798	br. sh. drlg.
Belridge Oil, No. 27-19, North Belridge, Kern	27-27-20	5,298	sd. sh. drlg.
Belridge Oil, No. 27-31, North Belridge, Kern	27-27-20	4,985	sd. sh. drlg.
Tide Water A. O., No. 22-3, North Belridge, Kern	22-27-20	6,275	sd. sh. drlg.
Tide Water A. O., No. 22, North Belridge, Kern	21-27-20	3,897	sd. sh. drlg.
B & S Drlg., No. 1 Newberry, Round Mountain, Kern	32-28-29	2,300	dry; abd.
Honolulu Oil, No. 58, Round Mountain, Kern	20-28-29	2,132	P.B. 2,052
Kern Oil, No. 25-3-C, Kern Front, Kern	25-28-27	1,965	pump 75 b.d.
Heim & Smith, No. 7-A Kernco, Kern River, Kern	34-28-28	675	sd. sh. drlg.
Cal. Star Oil, No. 5-80, Kern River, Kern	22-28-27	2,660	cleaning out
Trico O. & G., No. 1 Villard, Mount Poso, Kern	17-26-28	1,790	dry; abd.
Ring Oil, No. 7 Bowles, Mount Poso, Kern	29-26-28	1,740	rig to pump
Ring Oil, No. 3 Rogers-Jones, Mount Poso, Kern	29-26-28	1,691	rig to pump
Richfield Oil, No. 1, Union Avenue, Kern	5-30-28	5,223	sd. sh. drlg.
Monterey Expl., No. 3 Nichols, Edison, Kern	14-30-29	1,271	sd. sh. drlg.
Western Gulf Oil, No. 4 Price, Fruitvale, Kern	22-29-27	3,870	O.S. drlg.
Meridian Oil, No. 5 fee, Fruitvale, Kern	23-29-27	3,108	pump 195 b.d.
Texas Co., No. 1 Lowe, Fruitvale, Kern	7-29-27	10,120	hd. sd. drlg.
Greer, P. H., No. 2 Perrel, Mountain View, Kern	9-31-29	6,638	redrlg. 6,321
Renner, G. E., No. 2 R. H. L., Sivert, Kern	27-30-30	214	sd. sh. drlg.
Continental Oil, No. 3-A, KCL, Wasco, Kern	8-27-24	13,060	sd. sh. drlg.
Continental Oil, No. 1, KCL, Seaboard, Wasco, Kern	26-27-24	12,778	redrlg. 11,930
Standard Oil, No. 8-1-B, KCL, Wasco, Kern	17-24-24	12,450	sd. sh. drlg.
Standard Oil, No. 1 Mushrush, Wasco, Kern	7-27-24	11,590	sd. sh. drlg.
Cal. Lands, Inc., No. 1 Salisbury, Buttonwillow, Kern	7-29-24	2,302	sd. sh. drlg.
Superior Oil, No. 2 Ruhl, Rio Bravo, Kern	1-29-25	9,285	sd. sh. drlg.
Superior Oil, No. 1 Helbling, Rio Bravo, Kern	1-29-25	14,018	sd. sh. drlg.
Union Oil, No. 2-34, KCL, Rio Bravo, Kern	34-28-25	11,204	redrlg. 10,080
Union Oil, No. 5-34, KCL, Rio Bravo, Kern	34-28-25	9,992	sd. sh. drlg.
Union Oil, No. 6-34, KCL, Rio Bravo, Kern	34-28-25	1,487	sd. sh. drlg.
Getty Oil, No. 3 Ramsey, Rio Bravo, Kern	35-28-25	2,990	sd. sh. drlg.
General Pet., No. 4 Wagoner, Rio Bravo, Kern	35-28-25	11,005	sd. sh. drlg.
General Pet., No. 4 Van Ness, Rio Bravo, Kern	2-29-25	3,171	sd. sh. drlg.
Standard Oil, No. 2 Fleishauer, Greeley, Kern	20-29-26	10,490	sd. sh. drlg.
Standard Oil, No. 1 Elrich, Greeley, Kern	20-29-26	3,796	sd. sh. drlg.
Superior Oil, No. 1 Krause, Greeley, Kern	21-29-26	10,141	sd. sh. drlg.
Continental Oil, No. 2-B, KCL, Rosedale, Kern	12-29-26	9,200	dry; abd.
Shell Oil, No. 67-30-A KCL, Ten Section, Kern	30-30-26	8,220	flow 2,750 b.d.
Shell Oil, No. 83-25-A, KCL, Ten Section, Kern	25-30-25	5,641	sd. sh. drlg.
Shell Oil, No. 47-20-B, KCL, Ten Section, Kern	20-30-26	6,760	sd. sh. drlg.
Shell Oil, No. 67-20-B, KCL, Ten Section, Kern	20-30-26	8,374	P.B. 8,226
Shell Oil, No. 45-14-A, KCL, Canal, Kern	14-30-25	8,340	flow 2,550 b.d.
Ohio Oil, No. 8-E, KCL, Canal, Kern	14-30-25	7,862	sd. sh. drlg.
Standard Oil, No. 1 Rio Bravo fee, Canal, Kern	12-30-25	7,280	sd. sh. drlg.
Richfield Oil, No. 1, KCL, Tupman, Kern	32-30-25	7,790	sd. sh. drlg.
Ohio Oil, No. 1-F, KCL, Coles Levee, Kern	10-31-25	5,361	sd. sh. drlg.
Ohio Oil, No. 8-A, KCL, Buena Vista Lake, Kern	32-31-26	10,044	salt water
Gibson Oil, No. 3 Blanck, Midway-Sunset, Kern	6-11-23	941	sd. sh. drlg.
Lilly Oil, No. 3 Lilly, Midway-Sunset, Kern	36-32-23	851	hd. sd. drlg.
Magnuson, C. A., No. 1 Midway, Midw.-Sunset, Kern	19-31-23	3,902	sd. sh. drlg.
Big Ten Oil, No. 12 Midway, Midway-Sunset, Kern	36-32-23	1,265	pump 32 b.d.
Richfield Oil, No. 1, KCL, Wheeler Ridge, Kern	28-11-20	6,560	sd. sh. drlg.
Petrol Corp., No. 33-5 Reserve, Tejon Ranch, Kern	33-11-19	4,607	will deepen
Pure Oil, No. 1, SPL, Huron, Fresno	31-18-17	12,130	hd. sh. drlg.
Magnet Oil, No. 2 Fearon, Fresno	18-19-15	4,266	hd. sh. drlg.
Tide Water A. O., No. 1-F, North Coalinga, Fresno	1-19-15	3,570	sd. sh. drlg.
Jacalitos Oil, No. 1, Jacalitos Hills, Fresno	14-21-15	7,264	gr. sd. drlg.
Pet. Sec., No. 7-7-F, Guijarral Hills, Fresno	18-20-16	6,925	O.S. drlg.
Pet. Sec., No. 88-12-C Grimes, Guijarral Hills, Fresno	12-20-15	6,968	flow 5,018 b.d.
Goetz, F., Co., No. 1, Guijarral Hills, Fresno	10-20-15	5,971	br. sh. drlg.
Standard Oil, No. 82-13 fee, Guijarral Hills, Fresno	13-20-15	6,182	sd. sh. drlg.
Texas Co., No. 19 Mohawk, Guijarral Hills, Fresno	12-20-15	4,424	P.B. 4,224
Universal Consd. Oil, No. 1, Guijarral Hills, Fresno	12-20-15	7,950	sd. sh. drlg.
Tide Water, No. 66 Guardian, Guijarral Hills, Fresno	12-20-15	5,898	hd. sd. drlg.
Superior Oil, No. 1 Hight, Guijarral Hills, Fresno	8-20-15	7,999	flow 2,450 b.d.
Dauphin Dev., No. 2 Boone, Alcalde, Fresno	30-21-14	2,280	sd. sh. drlg.
Superior Oil, No. 4-H, Kettleman North, Fresno	29-21-17	8,600	redrlg. 6,252
K.N.D.A., No. 38-6-Q Kettleman North, Kings	6-22-18	7,880	gr. sd. drlg.
K.N.D.A., No. 27-8-Q, Kettleman North, Kings	6-22-18	7,950	hd. sd. drlg.
K.N.D.A., No. 58-8-Q, Kettleman North, Kings	8-22-18	7,955	hd. sd. drlg.
K.N.D.A., No. 36-16-Q, Kettleman North, Kings	16-22-18	2,557	sd. sh. drlg.
K.N.D.A., No. 38-16-Q, Kettleman North, Kings	16-22-18	7,150	hd. sd. drlg.
K.N.D.A., No. 43-20-Q, Kettleman North, Kings	20-22-18	8,914	swabbing
K.N.D.A., No. 27-22-Q, Kettleman North, Kings	22-22-18	8,685	sd. sh. drlg.
Standard Oil, No. 21-13-P, Kettleman North, Kings	13-22-17	7,676	sd. sh. drlg.
Standard Oil, No. 74-7-Q, Kettleman North, Kings	7-22-18	8,985	completing
Standard Oil, No. 41-17-Q, Kettleman North, Kings	17-22-18	5,580	sd. sh. drlg.
Standard Oil, No. 61-21-Q, Kettleman North, Kings	21-22-18	7,296	cmtd. 7,170
Irving, A. R., No. 1 Bisconer, Dudley Ridge, Kings	11-24-20	2,242	idle
Caminol, No. 3 Amalgamated, Allensworth, Tulare	29-24-24	8,785	br. sh. drlg.
Texas Co., No. 1 Lewis, King City, Monterey	13-19- 5	2,990	br. sh. drlg.
Lee, H. E., No. 1 Defiance, Elkhorn, San Luis Obispo	7-32-22	220	idle
Loma Grande Oil, No. 1 Edna, San Luis Obispo	28-31-13	702	sd. sh. drlg.
Hancock Oil, No. 1 Dick, Huasna, San Luis Obispo	30-12-33	5,593	P.B. 3,750
Ohio Oil, No. 2 Willard, Willows, Glenn	18-20- 2	1,587	sd. sh. drlg.
Amerada Pet., No. 1 California Lands, Colusa, Colusa	34-16- 1	6,970	hd. sh. drlg.
Wilshire Oil, No. 2 Crowell, San Mateo	20- 6- 5	. . .	port. outfit
Richfield Oil, No. 1, Potrero Hills, Solano	10- 4- 1	4,270	sd. sh. drlg.
Orestimba Oil, No. 1 S. N., Newman, Stanislaus	12- 7- 7	140	sd. sh. drlg.

IMPORTANT WELLS AND SOUTHERN CALIFORNIA WILDCATS

Company, well, location, and county—	S. T. R.	Depth	Status—
Sovereign Oil, No. 2 Community, El Segundo, L. A.	12- 3-15	7,331	rig to pump
Sovereign Oil, No. 1 Coppinger, El Segundo, L. A.	12- 3-15	7,300	completing
Rolling Hills Oil, No. 1 Weston, Palos Verdes, L. A.	27- 4-14	5,100	O.S. drlg.
Allison & Oglesby, No. 1 Gerner, Torrance, L. A.	23- 4-14	5,166	sd. sh. drlg.
Alford & Thompson, No. 1 fee, Torrance, L. A.	23- 4-14	3,960	mill on junk
Berseid & Clark, No. 1 Basin, Torrance, Los Angeles	23- 4-14	3,783	will deepen
Blue Bell Pet., No. 1 Simons, Torrance, Los Angeles	23- 4-14	5,271	P.B. 4,880
Bandini Pet., No. 1 Harbor, Torrance, Los Angeles	23- 4-14	3,605	rigging up
Coastal Counties Oil, No. 6, Torrance, Los Angeles	23- 4-14	4,850	sd. sh. drlg.
Caldale Oil, No. 1 Lomita, Torrance, Los Angeles	23- 4-14	4,980	rig to pump
Collier, P. V., No. 1 Smith, Torrance, Los Angeles	23- 4-14	3,605	rigging up

KEY TO ABBREVIATIONS USED IN DRILLING REPORTS

Abd., abandoned.
Acd., acidized.
B.O., barrels of oil.
B.P.D., barrels per day.
B.D., barrels daily.
B.P., back pressure.
B.R., building rig.
Br. sh., brown shale.
B.S., basic sediment.
Cd. or Crd., cored.
C.D., corrected depth.
Cg., coring.
Cmtd., cemented.
C.O., cleaning out.
Comp., completed.
Compr., compressor.
C.P., casing pressure, also cement through perforations.
Csg., casing.
D.D., drilling (or drilled) deeper.
Drlg. or Drg., drilling.
Drk. or Dk., derrick.
D.S., drill stem.
D.&A., dry and abandoned.
Fsg., fishing.
Gbo., gumbo.
G.I., gas injection.
Gr., gravity.
Gr. sd., gray sand.
Grn. sh., green shale.
Hd. sd., hard sand.
H.F.W., hole full of water.
I.P., initial production.
L., lime.
L.D.D., later drilled deeper.
Lnr., liner.
Loc., location.
M.I.M., moving in material.
M.I.R., moving in rig.
M.I.R.T., moving in rotary tools.
M.O.T., milling on tools.
O.I.H., oil in hole.
O.S., oil sand.
O.T.D., old total depth.
O.W.D.D., old well drilling deeper.
O.W.P.B., old well plugging back.
P.B., plugging or plugged back.
P.B.P., pulling or pulled big pipe.
P.L., pipe line.
P.L.O., pipe line oil.
Pmpg., pumping.
P.O.P., putting on pump.
P.P., pulled pipe.
Rd. sd., red sand.
Rd. sh., red shale.
Recmt., recemented.
Rmg., reaming.
Redrlg., redrilling.
Rng., running.
R.O.G., rig on ground.
R.P., rock pressure.
R.U., rigging up.
R.U.R., rigging up rotary.
R.U.S.T., rigging up standard tools.
R.&T., rods and tubing.
S. or Sd., sand.
S.D., shut down.
Sdy. sh., sandy shale.
Sdtrk. or St., sidetracking.
S.D.P.L., shut down for pipe line.
S.D.O., or S.D.W.O., shut down awaiting orders.
S.G., show gas.
Sh.&L., shale and lime.
S.I., shut in.
S.I.P., shut in, prorated.
S.L.M., steel line measurement.
S.O., show oil.
S.O.G.&W., show of oil, gas and water.
Spdg. or Spd., spudding.
S.R., straightreaming.
Stdg., standardizing (also standing).
S.W., salt water.
Swbg., swabbing.
T.A., temporarily abandoned.
Tbg., tubing.
T.D., total depth.
T.P., tubing pressure.
Tr., tract.
U.R., underreaming.
W.I.H., water in hole.
W.O., workover.
W.O.C. or W.O.C.S., waiting on cement to set.
W.P., working pressure.
W.S.O., water shutoff.
W.S.S.O.K., water shut off O.K.
W.S.O.N.G., water shutoff no good.
W.S.R. or W.O.S.R., awaiting standard rig.
Wtr., water.

Consolidated Pet., No. 3, Torrance, Los Angeles	23-	4-14	4,965	sd. sh. drig.
Cal. Star Oil, No. 1 Whitacre, Torrance, Los Angeles	23-	4-14	5,040	pump 178 b.d.
Douglas, A., No. 1 Beaudette, Torrance, Los Angeles	23-	4-14	4,861	sd. sh. drig.
Dunphy, S. R., No. 1 Lomita, Torrance, Los Angeles	23-	4-14	5,002	cleaning out
Del Amo Oil, No. 1 Denbo, Torrance, Los Angeles	23-	4-14	4,890	sd. sh. drig.
Elexico Oil, No. 3 Airey, Torrance, Los Angeles	22-	4-14	4,981	flow 380 b.d.
Eriksson, G., No. 3 Fortuna, Torrance, Los Angeles	23-	4-14	4,980	pump 130 b.d.
Fiat Oil, No. 1 Seeple, Torrance, Los Angeles	23-	4-14	4,966	flow 603 b.d.
Freeman Oil, No. 1 Lomita, Torrance, Los Angeles	23-	4-14	4,960	deepened
Goetz, R. L., No. 1 Monica, Torrance, Los Angeles	23-	4-14	4,840	cmtd. 4,810
H. D. Oil, No. 1 Lomita, Torrance, Los Angeles	23-	4-14	3,807	rigged up
Jones-Long Oil, No. 2, Torrance, Los Angeles	23-	4-14	4,971	flow 380 b.d.
Kenber Oil, No. 1 Berken, Torrance, Los Angeles	23-	4-14	5,015	sd. sh. drig.
Kerben Oil, No. 2 Empire, Torrance, Los Angeles	23-	4-14	3,160	sd. sh. drig.
Kovell Oil, No. 3 Lomita, Torrance, Los Angeles	22-	4-14	4,797	sd. sh. drig.
Kovell Oil, No. 4 Lomita, Torrance, Los Angeles	23-	4-14	3,980	sd. sh. drig.
Louisiana Oil, No. 1 Lord, Torrance, Los Angeles	22-	4-14	3,800	will deepen
Lebow, C. H., No. 1 Ellis, Torrance ,Los Angeles	23-	4-14	1,986	sd. sh. drig.
Mildon Oil, No. 1 Lomita, Torrance, Los Angeles	23-	4-14	4,925	sd. sh. drig.
Maldum Oil, No. 1 R. K., Torrance, Los Angeles	23-	4-14	5,129	flow 135 b.d.
Medill, John, No. 4 Frenger, Torrance, Los Angeles	23-	4-14	3,595	rigging up
McDonald & Burns, No. 11 Moore, Torrance, L. A.	23-	4-14	2,091	sd. sh. drig.
McCaslin, W. E., No. 2 Lomita, Torrance, L. A.	14-	4-14	4,993	rig comp.
McWherter, C. L., No. 1 Lomita, Torrance, L. A.	23-	4-14	4,976	pump 160 b.d.
M. P. S. Oil, No. 1 Julian, Torrance, Los Angeles	23-	4-14	4,999	cleaning out
Moon Oil, No. 2 Julian, Torrance, Los Angeles	23-	4-14	3,787	rigged up
Oil Dev., No. 1 Dunphy, Torrance, Los Angeles	23-	4-14	4,934	idle
Pennsylvania Oil, No. 1 Lomita, Torrance, L. A.	23-	4-14	4,922	pump 145 b.d.
Pacific West. Oil, No. 4 Marble, Torrance, L. A.	15-	4-14	4,839	sd. sh. drig.
Pacific West. Oil, No. 7 Marble, Torrance, L. A.	15-	4-14	3,800	will deepen
Pettijohn, J. E., No. 1 Lomita, Torrance, L. A.	22-	4-14	4,782	sd. sh. drig.
Packard Pet., No. 5 Kelley, Torrance, Los Angeles	22-	4-14	4,985	flow 320 b.d.
Standard Oil, No. 1-14 Marble, Torrance, L. A.	22-	4-14	4,140	sd. sh. drig.
Standard Oil, No. 2-8 Marble, Torrance, L. A.	22-	4-14	2,181	sd. sh. drig.
Star Pet., No. 1 Patton, Torrance, Los Angeles	23-	4-14	5,280	P.B. 5,130
Sonwell Oil, No. 4, Torrance, Los Angeles	23-	4-14	4,955	rig to pump
Silver Strand Oil, No. 2, Torrance, Los Angeles	22-	4-14	4,952	flow 340 b.d.
Sunny State Oil, No. 1 Bailes, Torrance, Los Angeles	23-	4-14	4,180	sd. sh. drig.
Ter Heun Oil, No. 1 Lomita, Torrance, Los Angeles	23-	4-14	4,906	sd. sh. drig.
Texas Co., No. 11 Wilson, Torrance, Los Angeles	14-	4-14	4,980	pump water
C. C. M. O. Co., No. 8, Torrance, Los Angeles	15-	4-14	4,997	sd. sh. drig.
General Pet., No. 9 Poggi, Harbor City, Los Angeles	30-	4-13	5,280	tested wet
O'Donnell, J. L., No. 43, Harbor City, Los Angeles	25-	4-14	4,297	sd. sh. drig.
Padran Oil, No. 1 McEwen, Harbor City, L. A.	25-	4-14	2,072	sd. sh. drig.
D & B Oil, No. 2 Dawn, Harbor City, Los Angeles	25-	4-14	5,411	gr. sd. drig.
Bush Oil, No. 1 Gimenez, Harbor City, Los Angeles	25-	4-14	5,260	flow 231 b.d.
Ring Oil, No. 1 Hawkins, Harbor City, Los Angeles	25-	4-14	3,486	sd. sh. drig.
Silverado Oil, No. 1, Harbor City, Los Angeles	25-	4-14	3,992	sd. sh. drig.
Texas Co., No. 1 Oakley, Harbor City, Los Angeles	30-	4-13	3,463	sd. sh. drig.
Union Oil, No. 61 Callender, Dominguez, L. A.	32-	3-13	7,260	sd. sh. drig.
Shell Oil, No. 95 Reyes, Dominguez, Los Angeles	33-	3-13	9,110	pump water
Shell Oil, No. 96 Reyes, Dominguez, Los Angeles	33-	3-13	4,672	O.S. drig.
Stabler, W., No. 2 Marland, Dominguez, Los Angeles	3-	4-13	4,506	P.B. 4,349
Selbar Oil, No. 1 Richfield, Dominguez, Los Angeles	3-	4-13	4,248	will redrl.
Fairfield, F. E., No. 1 Abel, Rosecrans, Los Angeles	19-	3-13	5,177	sd. sh. drig.
Exeter Oil, No. 4 Higgins, Rosecrans, Los Angeles	20-	3-13	7,604	O.S. drig.
Bankline Oil, No. 1 Kirby, Rosecrans, Los Angeles	20-	3-13	5,998	sd. sh. drig.
Barnsdall Oil, No. 6 Trust, Rosecrans, Los Angeles	18-	3-13	6,391	sd. sh. drig.
Union Oil, No. 24 Rosecrans, Rosecrans, L. A.	19-	3-13	7,655	completing
Union Oil, No. 25 Rosecrans, Rosecrans, L. A.	19-	3-13	6,391	sd. sh. drig.
Union Oil, No. 26 Rosecrans, Rosecrans, L. A.	19-	3-13	4,170	sd. sh. drig.
Universal Consd., No. 5 Trust, Rosecrans, L. A.	18-	3-13	7,418	sd. sh. drig.
Republic Pet., No. 1 Trust, Rosecrans, L. A.	18-	3-13	6,141	redrlg. 3,980
Superior Oil, No. 10 Maxwell, Rosecrans, L. A.	20-	3-13	7,235	sd. sh. drig.
H. B. Oil, No. 1 Stevens, Rosecrans, Los Angeles	20-	3-13	6,033	redrlg. 5,171
Tide Water A. O., No. 1 Porter, San Fernando, L. A.	27-	3-16	4,225	sd. sh. drig.
Royal Lands, No. 1 Ramona, Castaic, Los Angeles	8-	4-17	1,098	fish. bit
General Pet., No. 1 Flint, Wilmington, Los Angeles	33-	4-13	3,500	to deepen
General Pet., No. 19 Harbor, Wilmington, L. A.	2-	5-13	2,538	sd. sh. drig.
General Pet., No. 41 Harbor, Wilmington, L. A.	2-	5-13	3,045	sd. sh. drig.
General Pet., No. 1 P. E., Wilmington, L. A.	2-	5-13	4,100	flow 1,224 b.d.
Allied Pet., No. 22, Wilmington, Los Angeles	35-	4-13	4,030	flow 620 b.d.
Bankline Oil, No. 11-U.P., Wilmington, L. A.	2-	5-13	2,681	sd. sh. drig.
Hollywood Oil, No. 3 Baxter, Wilmington, L. A.	35-	4-13	3,112	flow 385 b.d.
O'Kane & Brain, No. 3 L.B.H.D., Wilmington, L. A.	2-	5-13	2,957	flow 170 b.d.
Ind. Drlg., No. 1 Vosper, Wilmington, Los Angeles	2-	5-13	2,557	sd. sh. drig.
Richfield Oil, No. 10-P.D., Wilmington, Los Angeles	2-	5-13	3,665	sd. sh. drig.
Richfield Oil, No. 17-P.D., Wilmington, Los Angeles	2-	5-13	2,191	sd. sh. drig.
Richfield Oil, No. 27-P.D., Wilmington, Los Angeles	2-	5-13	2,631	sd. sh. drig.
Richfield Oil, No. 1-G, Wilmington, Los Angeles	35-	4-13	3,115	O.S. drlg.
Richfield Oil, No. 1 P. & G., Wilmington, Los Angeles	2-	5-13	3,950	cleaning out
Royalty Service, No. 7-A, Wilmington, Los Angeles	33-	4-13	5,627	sd. sh. drig.
Superior Oil, No. 1 School, Wilmington, Los Angeles	2-	5-13	3,030	sd. sh. drig.
So. Cal. Pet., No. 1-W, Wilmington, Los Angeles	33-	4-13	5,290	sd. sh. drig.
Union Pacific R.R., No. 82, Wilmington, L. A.	4-	5-13	3,140	sd. sh. drig.
Union Pacific R.R., No. 90, Wilmington, L. A.	3-	5-13	3,968	sd. sh. drig.
Union Pacific R.R., No. 91, Wilmington, L. A.	4-	5-13	2,650	sd. sh. drig.
St. Helens Pet., No. 28 Monterey, Montebello, L. A.	2-	2-12	6,290	tested wet
St. Helens Pet., No. 29 Monterey, Montebello, L. A.	2-	2-12	4,792	hd. sd. drig.
St. Helens Pet., No. 2 Taylor, Montebello, L. A.	2-	2-12	2,681	sd. sh. drig.
Union Oil, No. 1 Howard, Montebello, Los Angeles	2-	2-12	6,244	deepening
Union Oil, No. 3 Howard & Smith, Montebello, L. A.	2-	2-12	5,387	sd. sh. drig.
V-8 Oil, No. 1 Estelle, Montebello, Los Angeles	2-	2-12	6,318	sd. sh. drig.
Mon. Wesco, Inc., No. 1 Seavers, Montebello, L. A.	2-	2-12	5,780	sd. sh. drig.
Pongratz Pet., No. 1 Martin, Montebello, L. A.	2-	2-12	2,690	sd. sh. drig.
Standard Oil, No. 3 Harvey, Montebello, L. A.	2-	2-12	5,198	sd. sh. drig.
Standard Oil, No. 3 Braun, Montebello, Los Angeles	2-	2-12	4,861	sd. sh. drig.
Standard Oil, No. 1 Kaufman, Montebello, L. A.	2-	2-12	3,085	sd. sh. drig.
Mont. Res. Oil, No. 1 M.L.&W., Montebello, L. A.	2-	2-12	4,460	sd. sh. drig.
Hathaway Oil, No. 1 Dore, Montebello, L. A.	2-	2-12	1,987	sd. sh. drig.
Herley-Kelly, Inc., No. 1 Masser, Montebello, L. A.	2-	2-12	5,491	sd. sh. drig.
Brit.-American Oil, No. 1 Pico, Los Angeles	12-	2-12	4,568	will deepen
Security L. & W., No. 1 Tobey, Whittier, L. A.	8-	2-11	2,230	hd. sh. drig.
Hilldon Oil, No. 4-B-P, North Long Beach, L. A.	13-	4-13	4,495	flow 365 b.d.
Texas Co., No. 2-3 Foster, Long Beach, L. A.	19-	4-12	5,000	P.B. 632
De Soto Oil, No. 1, Long Beach, Los Angeles	30-	4-12	7,251	cleaning out
Texas Co., No. 3 Alamitos, Seal Beach, Orange	3-	5-12	5,225	cleaning out
Battersby, J. M., No. 1 Carmenita, Orange	21-	3-11	8,350	hd. sh. drig.
D. H. B. Oil, No. 1, Buena Park, Orange	34-	3-11	2,998	sd. sh. drig.
Standard Oil, No. 3 Bastanchury, W. Coyote, Orange	16-	3-10	5,622	fishing
Shell Oil, No. 1 Kiker, Richfield, Orange	21-	3- 9	2,254	sd. sh. drig.
A. V. Oil, No. 1, Costa Mesa, Orange	16-	6-10	4,660	tested wet
So. Counties Oil, No. 1 Serrano, San Bernardino	22-	2- 8	1,016	sd. sh. drig.
Dauphin Dev., No. 1 Irwin, Ponto, San Diego	16-12-	4	435	sd. sh. drig.

OKLAHOMA

Week Ending September 17

NORTHERN OKLAHOMA

Beckham County

Wagner & Stogner No. 1 McGee, NE NE SE sec. 25-8-22w. O.W.D.D.; T.D. 1,029 ft.; S.G.; S.D.

Caddo County

Texas Co. No. 1 Smith, C NE NW Sec. 2-5-12w. R.U.R.

Coal County

Carter et al No. 1 Mote, C E½ SW NW Sec. 19-2-10. Drlg. 6,776 ft.

Comanche County

E. N. Eldridge No. 1 Aetna Life, SW SE SW Sec. 2-1-10w. T.D. 960 ft.; S.D.

Midnite O. & G. Co. No. 1 Howe, NW NW NW Sec. 20-2n-13w. T.D. 550 ft.; S.D.

Clyde Roach No. 1-A Green, SE SE SW Sec. 2-1-13w. T.D. 765 ft.; S.D.

Garfield County

Champlin Ref. Co. No. 1 Boehm, SW SW NE Sec. 4-24-8w. Viola 6,595 ft.; dolo. 6,625 ft.; T.D. 6,650 ft.; rng. csg. W.O.C.

I.T.I.O. No. 1 Kechin, C SE SE sec. 17-22-5w. Miss. 6,113 ft.; drlg. 6,368 ft.

Garvin County

H. R. Hollenbach et al No. 1 Butterly, NE NE SE sec. 22-1n-1e. 3,218,000 ft. gas; drlg. 3,205 ft.; S.D.; repairs.

Grady County

Carter Oil Co. et al No. 1 Smith C-58, C SE SW Sec. 26-5-8w. T.D. 1,040 ft.

Hughes County

City of Holdenville No. 1 Fairgrounds, SE SE SE Sec. 13-7-8. S.D. at 1,200 ft.

F. W. Cooper No. 1 Samuel, NW SE NW Sec. 19-16-8. Drlg. 2,932 ft.

Homer Doup et al No. 1 Bond, NE NE SW Sec. 7-7-9. Drlg. 1,915 ft.

Phillips Pet. Co. No. 1 Beeker, NE NW SW Sec. 8-5-10. T.D. 6,283 ft.; P.B. 5,632 ft.; swb. 12 B.O. and 53 B.W. in 9 hrs.

Kay County

Louis Blosser No. 1 Rudolph, NE NE SW Sec. 27-29-1w. T.D. 3,520 ft.; S.D.

Kingfisher County

Burton Pet. Corp. No. 1 Zerger, C SE SW Sec. 5-18-6w. Drlg. 2,727 ft.

Kiowa County

Anderson-Prichard Oil Corp. No. 1 Sch. Ld., SE SE SE Sec. 14-6n-17w. T.D. 2,196 ft.; abd.

R. L. Emerson No. 1 Handcock, SE SE NE Sec. 26-6-15w. Drlg. 325 ft.

Hughes & Reese No. 1 Fultz, SE SE SE Sec. 10-6-18w. T.D. 1,238 ft.; W.O.C.

Lincoln County

British-American No. 1 Markwell, C E½ E½ NE Sec. 26-12-4. Viola 5,346 ft.; dolo. 5,377 ft.; 1st Wilcox 5,414 ft.; 2nd 5,478 ft.; T.D. 5,512 ft.; S.D.O.

Ok-Texas No. 1 Black, SE cor. Sec. 31-16-6. Drlg. 3,843 ft.

Noble County

H. R. Hollenback No. 1 Mathews, C SW NW Sec. 9-20-1. T.D. 4,804 ft.; S.D.

Okfuskee County

Amerada No. 1 Conard, NE NW SW sec. 33-10-10. T.D. 4,068 ft.; D.&A.

Oklahoma County

Olson Oil No. 1 L. Vaneck, SE SW NW Sec. 4-12-3w. T.D. 6,776 ft.; P.B. 6,766 ft.; F. 8 B.O.P.H.; shot and f. 394 B.O. in 24 hrs.; S.I.

Pittsburg County

Burk-Greis No. 1 Goodman, NE NE SW Sec. 20-14-7. T.D. 4,242 ft.; H.F.W.; D.&A.

Supreme Oil Corp. No. 1 Hickey, NW SW NW sec. 4-2-15. T.D. 1,040 ft.; S.D.

Supreme Oil Corp. No. 1 Stevenson, SW SW SE Sec. 27-3-14. T.D. 1,300 ft.; S.D.

Pontotoc County

Jack Lynch et al No. 1-A Parker, SW SW SE sec. 17-4-8. T.D. 4,572 ft.; P.B. 4,490 ft.; rip in csg.; P.B. 4,090 ft.; S.D.

H. Z. Moore No. 1 Payne, SE NW SE Sec. 16-4-4. T.D. 997 ft.; S.S.O.; S.D.

Union Dev. Co. No. 1-A Abbott, SW NW NE sec. 34-3-6. T.D. 2,013 ft.; S.D.

Pottawatomie County

Hall & Briscoe No. 1 Merkle, NW NW SE Sec. 32-8-5. Drlg. 2,350 ft.

Geo. L. Pace No. 1 Riley, NE NE SE Sec. 2-9-3. Drlg. 4,557 ft.

A. D. Spears No. 1 Vinson, SW NW SW Sec. 29-8-5. 1st Wilcox 4,425 ft.; 2nd Wilcox 4,490 ft.; cg. 4,500-06 ft.; to run Schlum.

Summit Drlg. Co. No. 1 Good, C W½ NW SW Sec. 4-11-5. Drlg. 3,700 ft.

Seminole County

Boetcher O. & G. No. 1 Morgan, SE NW NW Sec. 8-5n-7. T.D. 2,622 ft.; S.D.O.

Patterson No. 1 Konawa City Park, NW SE NE Sec. 19-6-8. T.D. 2,712 ft.; S.D.O.

Rogers & Rogers No. 1 Robinson, SW SW SE Sec. 36-8-7. T.D. 3,138 ft.; S.S.O.

Washita County

Continental Oil Co. No. 1 Proctor, C NW Sec. 28-10-20w. Drlg. 5,314 ft.

L. B. McWhirter No. 1 fee, NW SW SW Sec. 34-8-19w. T.D. 2,172 ft.; S.D

SOUTHERN OKLAHOMA

Atoka County

C. M. Sheldon and Gardner Pet. Co. No 1 Lee, NE NW SW sec. 2-4s-10e. Arb 2,843 ft.; S.D. 3,455 ft.

Choctaw County

Jodie Ross et al No. 1 Hardy, SE SE NW Sec. 21-7s-15. Drlg. 1,015 ft.

Love County

Sinclair Prairie Oil Co. No. 1 Peabody, NE cor. Sec. 35-6s-2w. Drlg. sh. 7,520 ft.

Stephens County

M. J. Mitchell No. 1 Westfall, SE cor. Sec. 33-2-4w. T.D. 100 ft.; R.U.R.

Tillman County

Smith No. 2 Hammel, NE NW NW sec. 6-5s-15w. T.D. 2,380 ft.; fsg. D.P.

KANSAS

Week Ending September 17 (Descriptions are East unless marked otherwise)

Barton County

C. L. Carlock and Atlantic Ref. Co. No. 1 Demel, NE NW Sec. 30-17-13w. Drlg. 1,840 ft.

Long & Johnson No. 1 Eveleigh, SW SW NE Sec. 3-18-14w. Drlg. 595 ft.

Butler County

Pryor & Lockhart No. 1 Lietzke, NE SW NW Sec. 24-28-7. W.O.C. at 2,740 ft.

Fred Phillips No. 1 Hanshaw, NE NE SE Sec. 32-27-3. Drlg. 1,534 ft.

Soloman & Alexander No. 1 Sawyer, SW NW SW Sec. 2-28-7. Fsg. 175 ft.

Tide Water No. 1 Stockil, NW NE Sec. 28-23-5. Cg. 2,330-35 ft.

Cowley County

Barnsdall Oil Co. No. 1 Elliott, NE cor. Sec. 5-31-5. Drlg. 2,035 ft.

Ben Gralapp et al No. 1-A Clark, NW NW NE Sec. 11-31-3e. Drlg. 2,620 ft.

McKnab et al No. 1 O'Neil, NW NW SE Sec. 27-32-3. S.S.O. 2,768 ft.; Miss. 3,168 ft.; Arb. 3,526 ft.; T.D. 3,528 ft.; D.&A.

Ford County

Sinclair Prairie Oil Co. No. 1 Young, CSL NE sec. 34-27-21w. Viola 5,350 ft.; dolomite at 5,512 ft.; Wilcox 5,617 ft.; Arb. 5,629 ft.; T.D. 5,930 ft.; P.B. 5,025 ft.; flwd. 56 B.F. in 8 hrs.; S.I.

Graham County

Duwe & Farris and Atlantic Ref. Co No. 1 Parker, C SE SW Sec. 29-6s-23w. Drlg. 3,385 ft.

Greenwood County

Z. Dunalp et al No. 1 Warren, NW NW SW Sec. 4-28-10. T.D. 1,699 ft.; rng. csg.

Fullerton et al No. 1 Bates, NE SW SE Sec. 32-26-11. Spd. and S.D.

Ward McGinnis No. 3 Smith, NW NE NE Sec. 10-24-13. Pay 1,662-65 ft.; est. 15 B.O.P.D.

Harvey County

Lanahan Drlg. No. 1 Lagree, SE SE Sec. 4-23-3w. T.D. 280 ft.; S.D.

Kingman County

Bunte Bros. No. 1 Shepard, SE SE SE Sec. 10-27-10w. T.D. 4,529 ft.; P.B. 4,086 ft.; swbg. 4 B.O.P.H.

McPherson County

Marylyn Oil No. 1 Dixon, NW NE NW Sec. 7-19-2w. Drlg. 2,525 ft.

Marion County

Johnson et al No. 1-A Miltz, SW SW SW Sec. 24-17-4. Drlg. 2,135 ft.

Harwood Oil Co. No. 1 Kaufman, NW NW SE Sec. 27-17-4. Drlg. 2,260 ft.

Mead County

Cragin, Reeuscher & Turner No. 1 Adams, NW NW SE sec. 22-34-30w. T.D. 200 ft.; R.U.R.

Pacific Midwest Oil No. 1 Rexford, NE SE SW Sec. 8-30-28w. S.D. 1,350 ft.

Norton County

Power Oil and Olson Oil No. 1 Noel, CEL NE Sec. 12-4-21w. Drlg. 3,485 ft.

Ottawa County

Babcock Oil No. 1 Copeman, NW NW Sec. 18-10-2w. T.D. 2,600 ft.; S.D.

Pottawatomie County

J. A. Turner No. 1 Unshide, C NE NW Sec. 32-8-9. Drlg. 90 ft.

Pratt County

Champlin Ref. Co. No. 1 Elliott, SW NE Sec. 26-27-14w. Drlg. 4,545 ft.

Reno County

A. Scherzer No. 1 Krey, SE SW Sec. 19-23-10w. M.I.M.

Rice County

Glimac Oil Co. No. 1 Malone, SE SW NW Sec. 36-20-10w. Drlg. 40 ft.
Watchorn O. & G. Co. No. 1 Caldwell, NE SE NE Sec. 29-20-9w. R.U.S.T. 3,248 ft.

Rooks County

Producers Oil No. 1 Ham, SW NW sec 25-7-19w. S.D. 1,800 ft.
Shindheim & Haynes et al No. 1 Dorr, SE SW Sec. 13-9s-16w. T.D. 3,613 ft.

Russell County

Stearns No. 1 Stielow, NW cor. sec. 32 11-14w. Simp. 3,494 ft.; Arb. 3,536-52 ft.; T.D.; D.&A.

Saline County

Sullivan & Sidwell No. 1 Erickson, NE NE Sec. 28-16-3w. S.D. 1,800 ft.

Sedgwick County

D. M. Crowe No. 1 Murphy, SW SE Sec. 34-29-1w. Drlg. 295 ft.
Frank Hudson et al No. 1 Fulton, NE SE Sec. 35-28-1e. S.D. 2,355 ft.

Stafford County

Atlantic Ref. Co. No. 1 Wise, NW cor Sec. 13-24-14w. T.D. 3,822 ft.; F. 103 B.O. in 48 hrs.; 3,000,000 ft. gas; drlg. 4,118 ft.
Stanolind O. & G. Co. No. 1 Curtis, SE cor. Sec. 31-21-12w. Viola 3,544 ft.; Arb. 3,638 ft.; R.U.S.T. 3,640 ft.

Sumner County

Cameron & Spencer No. 1 Frey, NW cor. Sec. 5-30-1e. S.D. 90 ft.
Hapenney No. 1 Evers, SE SE Sec. 27-31-2. O.W.D.D.; old T.D. 2,030 ft.; drlg. 2,375 ft.

Thomas County

Ramsey Pet. Co. and John Mabee No. 1 Ryan, C NE SE Sec. 27-8-32w. Drlg. 4,000 ft.

Wabaunsee County

Fowler & Tague et al No. 1 Ave, NW SW NW Sec. 10-12-8. S.D. 300 ft.

Woodson County

Fleming et al No. 1 Central Life, SW SW SW Sec. 27-24-15. Drlg. 925 ft.
Joe Nathan No. 1 Ellis, NW NW SE Sec. 35-25-14. T.D. 1,611 ft.; wtr.; D. &A.
M. J. Trott No. 1 Abbott, NW NE NE Sec. 21-25-14e. Drlg. 350 ft.

ARKANSAS

Calhoun County

Samuel S. Alexander No. 1 Smythe, C NE NE Sec. 7-11-14. S.D.; boiler rep.; 13 ft.
C. E. Murdock No. 1 Southern Kraft Corp., SE cor. NW NW sec. 17-14-13. S.D. 2,400 ft.

Columbia County

Atlantic Ref. Co. No. 1 Baker, C SE NW Sec. 13-17-20. Top Tr. Pk. 4,138 ft.; T.C.U. 5,363 ft.; top Buckner 7,548 ft.; top Big L. 7,706 ft.; cd. to 7,779 ft.; sulfur odor, salty taste; ran elec. survey and abd.
Atlantic Ref. Co. No. 1 Baker-Garrett, C SE NE Sec. 14-17-20. Set 16-in. csg. 114 ft.; W.O.C.
Atlantic Ref. Co. No. 1 Harrington, C SW NW Sec. 14-17-20. Top Buckner 7,580 ft.; top Big L. 7,706 ft.; top oolitic L. 7,712 ft.; cd. to 7,789 ft.; oolitic L., sulfur odor and salt taste; D.&A. 7,789 ft.
Standard Oil Co. of La. No. 1 T. Crumpler, Sec. 15-17-19. Perf. 7,438-40 ft.; set retainer 7,435 ft.; circulated mud 2 hrs. and pmpd. 160 sacks cmt.; T.D. 7,500 ft.; ran tbg. 7,400 ft.; washed with wtr. flwg.
Standard Oil Co. of La. No. 2 J. L. Warren, Sec. 18-16-22. Drlg. sd.&blue sh. 6,940 ft.
Tide Water Seaboard No. 1 Beene, C SE NW Sec. 15-18-19. 18⅝-in. 209 ft.; S. D. 310 ft.
G. H. Vaughn No. 1 Garrett, C NE SE Sec. 14-17-20. Top Big L. 7,492 ft.; porous L. 7,511-28 ft. and 7,540-52 ft.; D.S.T. 7,534-52 ft.; rec. 1,350 ft. oil 11 min.; W.P. 44 lbs.; set 7-in. csg. 7,536 ft.; comp.; 582 B.P.D. and 1,000,000 ft. gas on ¼-in. ck.; T.P. 1,350 lbs.; C.P. 800 lbs.
G. H. Vaughn No. 2 Garrett, C SE SE Sec. 14-17-20. M.I. rig.

Craighead County

Tannark, Inc., No. 1 Ruby M. Martin, 580 ft. N line, 80 ft. E line, sec. 35-14n-3e. M.I.C.T. 1,754 ft.

Crittendon County

Stanley Oil Corp. No. 1 Danner hrs., O.W.W.O.; old T.D. 2,790 ft.; rng. 4-in. csg. to set on bttm.; will use 1 jt. perf. csg. 3,219-3,176 ft.; T.D. 3,351 ft.; rng. 4-in. csg.

Little River County

Barbee et al No. 1 Ada Mills, SE cor. SW NW Sec. 18-12-29. R.U.
Clark et all No. 1 Strawn, SW cor. SE Sec. 20-10-32. 10-in. csg. 63 ft.
Joe G. Straham et al No. 2 Dierks Lbr. Co. Top L. 2,425 ft.; S.D. 3,354 ft.

Lonoke County

Cabot Drlg. Club, Inc., No. 1 Benson Townsite, Sec. 18-4n-9w. Set 4½-in. csg. on pkr. 1,540 ft.; drlg. sd. rk. 2,330 ft.
J. W. Eddington No. 1 Anderson. Drlg. sd. rk.&L. 850 ft.
J. F. Russell No. 1 J. T. Gunter, SE cor. Sec. 17-5-10. S.D. 1,216 ft.

Miller County—Rodessa

Chamblee & Pitts No. 1 H. C. Mitchell, 330 ft. SE cor. E½ SW SE Sec. 2-20-5. Drlg. sh.&L. 4,535 ft.
Gerhig Co. No. 3 Mitchell, SW cor. SW SE Sec. 2-20-28. Drlg. sh. 1,250 ft.
Red River Valley Oil Co. No. 1 Beck, Sec. 34-15-26. T.D. 3,008 ft.; reperf. 2,786-2,808 ft.; reset pkr. 2,954 ft.; swbg. to test 3,008 ft.

Mississippi County

Benedum & Trees Oil Co. No. 1 Mack. 330 ft. SW cor. NW SW Sec. 2-15n-12e. T.D. 280 ft.; set 10¾-in. csg. 270 ft.; W.O.C.

Nevada County

Paul D. Bowlen No. 1 Stocks, C NW SE Sec. 9-15s-22w. Nac. sd. 1,178-1,211 ft.; cd. sd. showed sat.; T.D. 3,654 ft.; P.B. 1,300 ft.; perf. 1,197-1,203 ft.; bailed 25 B.P.D. fluid, 85% 12-grav. oil and 15% S.W.; 800 ft. F.I.H.; installing pump.

Pulaski County

Coker Oil Corp. No. 1 Stone, sec. 36-3n-11w. S.D. 905 ft.
A. L. Kitselman No. 2 A. L. Kitselman, Jr., SE SE SW Sec. 2-1s-13e. Drlg. hd. slate 3,491 ft.

Union County—Schuler

Atlantic Ref. Co. No. 2 Dumas, SE cor. NE NW Sec. 21-18-17. Drlg. rd.&gr. sh. 6,880 ft.
Crescent Drlg. Co. No. 1 Lewis, SE SW Sec. 16-18-17. Top Jones sd. 7,571 ft.; T.D. 7,637 ft.; 5½-in. csg. 7,637 ft.; comp.; 289 B.P.D.; ¾-in. ck.; T.P. 1,225 lbs.; C.P. 1,400 lbs.; perf. csg. 7,571-84 ft.
Crescent Drlg. Co. No. 1 Sewell, SW cor. NE NE Sec. 12-18-18. Set 13⅜-in. csg. 116 ft.; drlg. rd.&gr. sh. 5,560 ft.
Delta Drlg. Co. No. 1 Powledge, SW cor. NW NW Sec. 21-18-17. Set 16-in. csg. 114 ft. and 10¾-in. 1,868 ft.
E. M. Jones No. 1 Gallagher, Lot 4, NW SW Sec. 18-18-17. O.W.W.O.; old T.D. 5,929 ft.; cd. top Jones sd. 7,583 ft.; cd. to 7,634 ft.; drlg. to 7,660 ft.; set 7-in. csg. 7,646 ft.; T.D. 7,660 ft.
E. M. Jones No. 1-B Murphy Ld. Co., Sec. 13-18-18. O.W.W.O.; old T.D. 5,987 ft.; fsg. 1 jt. drill pipe and bit; T.D. 6,645 ft.
Lion Oil Ref. Co. No. 2 Clarence, Lot 1, SW Sec. 7-18-17. Drlg. sdy. sh. 7,425 ft.
Lion Oil Ref. Co. No. 2 Dee, SW cor. SE NW Sec. 17-18-17. Drlg. sdy. sh. 7,350 ft.
Lion Oil Ref. Co. No. 8 Hardy Murphy, C NE NW Sec. 9-16-15. R.U.
Lion Oil Ref. Co. No. 1 Henry, SE cor. Sec. 12-18-18. Set 16-in. 97 ft.
Lion Oil Ref. No. 4 Marine, NE cor. SE SE Sec. 17-18-17. Drlg. rd.&gr. sh. 5,800 ft.
Lion Oil Ref. Co. No. 5 Marine, SE cor. NE SE Sec. 17-18-17. Drlg. rd.&gr. sh. 4,953 ft.
Lion Oil Ref. No. 6-A Morgan, SE cor. Lot 1, SW Sec. 18-18-17. (Cor.); drlg. rd. sdy. sh. 7,045 ft.
Lion Oil Ref. Co. No. 1 Natl., NW cor NE SW Sec. 17-18-17. Top Jones sd. 7,544 ft.; T.D. 7,630 ft.; set 7-in. csg. 7,620 ft.; perf. 7,560-80 ft.; washed; would not flow; swbd. est. 15 B.P.H., 50% S.W.; set ret. 7,550 ft. and recmtd.; comp.; 521 B.P.D.; ½-in. ck.; T.P. 250 lbs.; C.P. 500 lbs.; perf. csg. 7,550-70 ft.
Lion Oil Ref. Co. No. 2 Nelson, Lot 5, Sec. 18-18-17. Top Jones sd. 7,552 ft.; T.D. 7,709 ft.; 7-in. csg. 7,961 ft.; comp.; 446 B.P.D.; 20/64-in. ck.; T.P. 625 lbs.; C.P. 925 lbs.; perf. 7,586-7,606 ft.
Lion Oil Ref. Co. No. 1 Powledge, SE cor., Lot 2, SW Sec. 7-18-17. 10¾-in. csg. 1,935 ft.
Lion Oil Ref. Co. No. 1 H. P. Sewell, NE cor. Lot 4, NW Sec. 18-18-17. Top Jones sd. 7,539 ft.; 7-in. csg. 7,715 ft.; T.D. 7,725 ft.; comp.; 267 B.P.D.; 16/64-in. ck.; T.P. 450 lbs.; C.P. 700 lbs.; perf. 7,588-7,608 ft.
Lion Oil Ref. Co. No. 2 Sewell, NE cor. Sec. 13-18-18. R.U.
Marine Oil Co. No. 2 J. H. Calloway, NW cor. E½ SE NE sec. 13-18-18. Set 16-in. csg. 142 ft.; T.D. 6,348 ft.; P.B. 6,133 ft. and set whipstock 6,250 ft.; drlg. 6,289 ft.
Phillips Pet. Co. No. 1-B Bryan, NW cor. NE SE Sec. 13-18-18. Drlg. rd.&gr. sh. 4,935 ft.
Phillips Pet. Co. No. 1 El Dorado Bnk., SW cor. NW SE Sec. 12-18-18. 10¾-in. csg. 1,717 ft.; drlg. 3,297 ft.
Phillips Pet. Co. No. 1 Edwards, SW NE Sec. 17-18-17. R.U.
Phillips Pet. Co. No. 2 Gan, NE cor. SE NE Sec. 18-18-17. Drlg. rd.&gr. sh. 6,416 ft.
Phillips Pet. Co. No. 1 Goodwin, Lot 1, NE Sec. 19-18-17. 10¾-in. csg. 1,716 ft.
Phillips Pet. Co. No. 1 Milling, SE cor. SW Sec. 7-18-17. Drlg. rd.&gr. sh. 6,201 ft.
Phillips Pet. Co. No. 1 Murphy, Lot 2, NW Sec. 19-18-17. R.U.
Phillips Pet. Co. No. 1 Nelson, Lot 3, NW Sec. 19-18-17. Drlg. 50 ft.
Phillips Pet. Co. No. 2 Sewell, Lot 3, SW Sec. 7-18-17. Drlg. rd.&gr. sh. 6,205 ft.
Phillips Pet. Co. No. 3 Sewell, Lot 5, SW Sec. 7-18-17. Drlg. rd.&gr. sh. 5,461 ft.
Phillips Pet. Co. No. 4 Sewell, Lot 4, SW Sec. 7-18-17. Drlg. rd. sdy. sh. 6,714 ft.
Roberts & Murphy No. 2 Leona, NW cor. Lot 6, SW Sec. 7-18-17. Top Jones sd. 7,586 ft.; top L. 7,683 ft.; T.D. 7,780 ft.; arn. run 7-in. csg.

Union County—Other

J. R. Lockhart No. 1 Raulston, sec. 12-17-14. Cd. oil sd. 3,160-75 ft.; D.S.T. 3,172-75 ft.; rec. drlg. fluid and S.W.; cd. 3,175-85 ft.; S.O.; salty taste; set 7-in. csg. 3,077 ft.; perf. 3,002-07 ft.; tstd. 2,750 ft. S.W.; reperf. 2,967-73 ft.; blew wild; est. 500 bbls. S.W.; P.B. 2,700 ft.; drld. out cmt. 2,980 ft.; perf. 2,968-76 ft.; set pkr. 2,960 ft.; tstd. 1,500,000 ft. gas; connecting up separator 2,980 ft.
J. R. Lockhart No. 2 Raulston, NE cor. SE Sec. 12-17-14. Cd. 6 ft. sat. sd. 2,985-96 ft.; D.S.T. 2,976-96 ft.; tstd. hole full oil and 40 ft. mud in 15 min.; W.P. 90 lbs.; arng. set csg.; T. D. 2,996 ft.

LOUISIANA

N. LOUISIANA WILDCATS

Bienville Parish

Ark.-La. Gas Co. No. 1-B Davis Bros. Lbr. Co., NW SW Sec. 7-16-4. R.U.
Desoto O. & G. Co. No. 1 Fleming, C NW NW Sec. 18-16-9. T.D. 5,525 ft.; 7-in. 5,390 ft.
Producers O. & G. Co. No. 1 Graves & Thomas, SE cor. SW SE Sec. 23-15-10. R.U.

Bossier Parish

W. M. Chambers No. 1 Thomas, SE cor. Sec. 10-22-11. S.D. 635 ft.
C. H. French No. 1 Weaver, sec. 14-19-11. W.O.C. 377 ft.
Premier Inv. Co. No. 2 Buckelew, SE NE Sec. 16-19-11. 6⅝-in. csg. 377 ft.; T.D. 414 ft.; comp.; pmp. 10 B.P.D.
Premier Inv. Co. No. 3 Buckelew, SE cor. NE Sec. 16-19-11. 8¾-in. csg. 83 ft.
Premier Inv. Co. No. 1 Community Corp., sec. 22-19-11. S.D. 310 ft.
Premier Inv. Co. No. 1 McDade, SE SW NE sec. 28-19-11. Tstd. est. 1,000,000 ft. gas; S.I.; T.D. 2,374 ft.; top oolitic L. 2,345 ft.; set 5½-in. csg. 2,300 ft without cmt.; set 7-in. csg. 2,026 ft. without cmt.; tstd. est. 1,000,000 ft. gas, S.S.O.; W.O.S.R. 2,384 ft.
J. B. Stovall et al No. 2 Ark. Fuel Oil Co. fee, NE SE Sec. 15-19-11. Set 6-in. 168 ft.; W.O.S.R. 372 ft.
J. B. Stovall et al No. 3 Ark. Fuel Oil Co. fee, NE SE Sec. 15-19-11. 6-in. csg. 362 ft.; W.O.C.
Triangle Drlg. Co. No. 2 Roy, C NW SW Sec. 18-17-11. Drlg. sh. 2,492 ft.

Caddo Parish

R. E. Allison No. 2 Ellerbee, 708 ft. E line, 1,992 ft. N line, Sec. 28-18-14. Base ch. rk. 1,750 ft.; 9⅝-in. csg. 2,059 ft. drlg. sh.&L. 3,520 ft.
J. W. Bailey No. 2 Caddo Lvy. Bd., SE cor. Sec. 36-21-16. R.U.
F. W. Burford No. 2 Brown, C SE SE Sec. 5-23-15. Drlg. L.&sh. 5,164 ft.
R. L. Bauman No. 1 Slattery Est., 660 ft. NW cor. Sec. 35-18-14. Set 13⅜-in. csg. 300 ft.; set 9⅝-in. csg. 2,053 ft.; gas sd. at 2,550 ft. blew out; rng. wild with D.S. in hole; made wtr.; sd. est. 10,000,000 ft. gas; S.I.
J. E. Carroll et al No. 1 Stiles, SW cor. NE Sec. 17-21-16. Set 6-in. csg. 1,481 ft.; comp.; 8 B.P.D. and 100 bbls. S. W. on pmp.; T.D. 1,014 ft.
Carney et al No. 1 Hart; O.W.W.O. Old T.D. 2,372 ft.; C.O. and arng. set 6-in. csg. 1,495 ft.
S. H. Cassidy No. 1 Caddo Lve. Bd. Tstd. S.W. 1,661 ft.; fsg. bailer.
W. D. Chew No. 5 Stiles, SW cor. Sec. 27-21-16. 6-in. csg. 1,027 ft.; drlg. 1,700 ft.
W. D. Chew No. 6 Stiles, SW NE Sec. 28-21-16. Drlg. sh. 775 ft.
Paul Cooper et al No. 1 Stiles, SE cor. NE NW Sec. 33-21-16. T.D. 1,712 ft.; acdz. with 3,000 gal.; csg. leaking; pulled and arng. D.D.
L. L. Davidson No. 3 Muslow, NE SE Sec. 26-21-16. Set 7-in. csg. 2,220 ft.
Tony DeGrazier No. 1 Welsh, NE cor. Sec. 3-20-16. 7-in. csg. 925 ft.; tstd. dry; S.O.&S.W.; W.O.; T.D. 968 ft.
Falcon Oil Co. No. 2 Glassell-Youree, SE cor. Sec. 26-20-15. Tstd. dry; S.O.&S. W.; will acdz.; T.D. 2,306 ft.
M. M. Ferrell No. 1 Dyer. Sec. 10-20-16. Set 6-in. csg. 1,008 ft.
C. G. Gibbons No. 1 Helpman, SW cor. Sec. 16-21-16. 8-in. 990 ft.; W.O.S.R.; T.D. 1,008 ft.
Gulf Oil Corp. No. 9 Chew, SW NE Sec. 33-21-16. 6-in. 1,806 ft.; W.O.S.R.; T.D. 1,825 ft.
Hollywood Oil Corp. No. 1 C.&B. Realty Co., C NE NE Sec. 22-17-14. R.U.
J. T. Humphrey No. 2 Caddo Lve. Bd. Sec. 26-21-16. Tstd. S.W. 1,011 ft.; P. B. 968 ft.; W.O.S.R.
W. C. Knox No. 1 Burton, NW cor. Sec. 7-20-15. S.D. 150 ft.
McClanahan et al No. 1 Muslow, NE NW sec. 31-21-15. Set 10¾-in. csg. 40 ft.; S.D.
E. W. McGoldrick No. 9 Muslow, SW cor. Sec. 32-21-15. W.O.S.R. 1,567 ft.
Manzell No. 1 Ramsey, SE cor. Sec. 32-21-15. 7-in. csg. 1,382 ft.; comp.; pmp. 35 B.P.D.; 3,000 gal. acd.; T.D. 1,565 ft.
F. W. Martin and Superior Oil Corp No. 1 Querbes, Sec. 8, Reg. Sec. 20-17-13. 13⅜-in. csg. 214 ft.; drlg. 4,205 ft.
J. Ober & Sons No. 1 fee, SE cor. sec 36-21-16. Set 8-in. csg. 1,431 ft.; tstd. dry 1,684 ft.; W.O.
Oils, Inc., No. 1 Cazaux, sec. 10-16-13. S.D.; contract depth, 3,500 ft.
Papadokis & Poppas No. 4 Spell, SE cor. Sec. 28-21-15. R.U.
J. E. Sedberry No. 1-A Dickinson, SW cor. sec. 10-19-14. Drlg. 2,410 ft.
Southern Star Pet. Corp. No. 1 Muslow, SE NW sec. 17-20-15. O.W.W.O.; old T.D. 1,500 ft.; set 8-in. csg. 2,150 ft.; T.D. 2,196 ft.
Southern Star Pet. Corp. No. 2 Muslow. NE cor. SE NW Sec. 17-20-15. Setting csg. 2,196 ft.

Caldwell Parish

E. T. Oakes et al No. 1 Kyles, NE cor. SW NE Sec. 18-11-3e. Set 12-in. csg. 467 ft.

Catahoula Parish

Sibley Sabine Oil Co. No. 1 Peck, S½ Sec. 36-10-8e. Cd. sd. sh. 1,848 ft.

Claiborne Parish

Harry Fotiades No. 1 T. H. Lloyd, C SE SE Sec. 10-20-5. Sat. L. 5,317-31 ft.; 5½-in. csg. 5,307 ft.; comp.; 188 B.P. D.; 17/64-in. ck.; T.P. 75 lbs.; C.P. 700 lbs.; T.D. 5,337 ft.
J. H. Henry No. 1 McDonald, NE cor. SE Sec. 3-20-5. 5½-in. csg. 5,342 ft.; perf. csg. 5,296-5,322 ft.; tstd. sh.; S.O.; W.O.; T.D. 5,354 ft.; D.&A.
Magnolia Pet. Co. No. 4 Sallie Lloyd, SE cor. Sec. 2-20-5. Sat. L. 5,384 ft.; 7-in. csg. 5,383 ft.; comp.; 849 B.P.D.; ½-in. ck.; T.P. 160 lbs.; C.P. 300 lbs.; T.D. 5,400 ft.
Maritzky & Bibby No. 1 McClung, Sec. 29-21-7. S.D.; rep. rig 1,425 ft.
H. O. Olson No. 1 L. L. Lowery. R.U. S.D.
Rodessa O. & R. Co. No. 2 Lloyd, C NE SW Sec. 10-20-5. Sat. L. 5,342-45 ft.; arng. set csg.; T.D. 5,362 ft.
Sklar Oil Corp. No. 1 Lowery, C SW SW Sec. 14-20-5. D.&A. 5,340 ft.
Union Prod. Co. No. 1 Hodges, Sec. 6-19-15. Comp.; 35,000,000 ft. gas daily; set 5¾-in. 5,603 ft.; T.D. 5,700 ft.

Concordia Parish

Benedum & McCormick No. 1 Allen, 330 ft. NE cor. Sec. 35-5n-8e. Drlg. 900 ft.
Edw. Addy et al No. 1 Posternack, NW SW Sec. 49-8n-9e. Arng. D.S.T. 1,382 ft.
Morrison & Co. No. 1 Winston sec. 7-9e. Top Wilcox 4,120 ft.; cd. S.W. sd.; W.O. 4,200 ft.

De Soto Parish

S. S. Alexander No. 1-A Stoll, sec. 5-12-16. Drlg. sh. 1,928 ft.
G. H. Collins et al No. 2 Joiner, sec. 28-11-12. Tstd. S.W. 3,001 ft.; P.B. 2,978 ft. and tstd. S.W.; W.O.
Paul Miller et al No. 2 Jal Drlg. Co., NE Sec. 5-11-11. S.D.; contract depth 4,000 ft.
Petroleum Heat & Power Co. No. 2 Kavanaugh, NE cor. NW SW sec. 7-11-11. Tstd. dry 2,874 ft.; W.O.
Pet. Heat & Power Co. No. 1 Rives, sec. 20-12-11. S.D. 3,620 ft.
A. L. Sutton No. 1 Frost Lbr. Co., C NE SE Sec. 35-11-15. R.U. and S.D.

Grant Parish

C. R. Bowers No. 1 Harrison Est., sec. 21-8-5. Drlg. sh. 1,971 ft.
J. E. Granstaff No. 1 Morrison, NE cor. SW SW Sec. 10-9-1e. Set 6-in. csg. 1,520 ft.; 8 ft. sd.; T.D. 1,530 ft.
Luther Terrill et al No. 1 Barnett, C

SW SW Sec. 19-9-1e. T.D. 1,700 ft.; D.&A.

La Salle Parish

O. L. Black No. 1 Tullas. Set 6-in. csg. 1,493 ft.; T.D. 1,495 ft.

Madison Parish

Continental Oil Co. No. 1 Singer Mfg Co., C NE NW Sec. 3-15-11e. Top anhy. 4,003 ft.; drlg. anhy. 4,068 ft.

Natchitoches Parish

Jos. E. Popkins No. 1 Peavy Lbr. Co., sec. 36-7n-9w. S.D. 510 ft.

Red River Parish

J. F. Lent No. 1 Chicago Coal & Ld. Co., SE cor. Sec. 17-13-11. Cd. hd. sdy. sh. 2,550 ft.

J. C. Prine No. 2 Haynes, SW cor. Sec. 20-13-10. Set 10-in. csg. 85 ft.; 8¼-in. 1,128 ft.; W.O.S.R. 1,398 ft.

J. C. Prine No. 3 Haynes, SW cor. Sec. 20-13-10. Drlg. 650 ft.

H. D. Rogers No. 1 Raney, SW cor. Sec. 20-13-9. T.D. 1,150 ft.; D.&A.; S.W.

Sabine Parish

Addison & Peterson No. 1 Dew, SE cor. SW SE Sec. 22-8-11. 6-in. 2,366 ft.

A. B. House No. 1 Sabine, NW NW Sec. 23-7-14. 8-in. csg. 2,134 ft.

Hunter Co. No. 7 Bowman-Hicks, C NW NW Sec. 13-7-13. 6-in. csg. 2,121 ft.; 5,000 gal. acd.; tstg. 2,544 ft.

LeGrande & Brown No. 1 Tatum, NE cor. NW NE Sec. 17-8-13. 7-in. csg. 1,900 ft.

W. L. McClanahan No. 1 Frost Lbr. Co., sec. 22-9-13. D.S.T. 2,927-3,028 ft.; tstd. est. 1,000,000 ft. gas and 9 jts. mud; ¼-in. ck.; blew out 4,745 ft.; S.W., mud and gas; cd. hd. sh.&L. 4,745-54 ft.; tstd. S.O. and used 3,000 gal. acd.; reacd. with 3,000 gal. 1,616 ft.; W.O. S.R.

Major Oil Co. No. 1 Loring, C SE NW Sec. 21-7-13. Top clk. 2,265 ft.; arng. acd. with 8,000 gal.; 8-in. csg. at 2,-272 ft.; T.D. 2,331 ft.; tstg. 2,615 ft.

Manitzia et al No. 1 Hale, SE cor. NE SE Sec. 7-7-13. 10-in. csg. 98 ft.

North American Oil Consolidated Co. No. 3 Stewart, C SE SE Sec. 29-21-10. Drlg. sh. 1,700 ft.

North American Oil Consolidated Co. No. 3 E. L. Stewart, C SE SE Sec. 29-21-10. R.U.

H. L. Nutting No. 1 4-L Co., C NE NW Sec. 24-7-11. 6-in. 2,665 ft.; T.D. 2,-831 ft.; tstg.

Geo. L. Pace No. 3 Logan Oil Co., SW NW Sec. 26-10-13. 10-in. 98 ft.; drlg. ch. rk. 1,479 ft.

W. L. Posey No. 2 Hale, SE cor. NE NW Sec. 12-7-13. Csg. leaking; set 4-in. 2,177 ft.; 3,000 gal. acd.; tstg. 2,-577 ft.

Richards & Holloway No. 1 Bowman Hicks, Sec. 11-7-13. Tstd. dry 2,404 ft.; acdzd. with 5,000 gal.; tstd. dry; T.D. 2,548 ft.; W.O.

Richards & Holloway No. 1 Hale, C NE NE Sec. 12-7-13. Set 5½-in. csg. 2,-078 ft.; comp.; pmp. 20 B.P.D. 2,540 ft.

Richards & Holloway No. 1 Long Bell, C NW NE Sec. 15-7-13. 10-in. 95 ft.; 5½-in. 2,130 ft.

Richards & Holloway No. 1 Sabine Lbr. Co., NE NW Sec. 7-7-12. O.W.W.O.; arng. acd. 2,710 ft.

C. R. Schuster No. 1 Mary Garcia, NE cor. NW SE Sec. 15-7-13. T.D. 2,603 ft. P.B. 2,585 ft.; tstd. dry S.D.; W.O. 2,-585 ft.

H. M. Sneed No. 1 Leone, 330 ft. S line, 400 ft. W line, NW SE sec. 8-7-13. R.U.

Tropical Oil Co. No. 1 Long Bell Lbr. Co., Sec. 5-8-13. D.S.T. 3,192-3,254 ft.; tstg. 65 ft. mud; S.G. in 10 min.; drlg. sh. 3,364 ft.

Zwolle Synd. No. 1 Mansfield Lbr. Co., Sec. 8-7-19. T.D. 4,323 ft.; 5-in. csg. 3,830 ft.; drlg. plug 4,323 ft.; 2,500 gal. acd. and swbg. to test sh., S.O.

Webster Parish

Hunt Oil Co. No. 8 Babb, sec. 13-21-10. Top Bodcaw sd. 8,255 ft.; 7-in. csg. 8,966 ft.; T.D. 9,017 ft.

Hunt Oil Co. No. 3 Bodcaw-Stewart, C NW SW Sec. 34-21-10. Holloway sd. 5,822-46 ft.; 9⅝-in. csg. 5,951 ft.; perf. 5,815-50 ft.; tstd. S.O.&G.; C.P. 500 lbs.; T.P. 0 lbs.; reperf. 5,815-50 ft.; tstd. 3,700 ft. O.I.H. and used 500 gal.; swbd. 85 B.P.D.; swbg. to test 3,500 ft. F.I.H.; T.D. 5,956 ft.

Hunt Oil Co. No. 2 Davis Unit, C NW NW Sec. 24-21-10. Drlg. sh.&L. 4,724 ft.

Hunt Oil Co. No. 20 Hope, C NE NW sec. 24-21-10. Top Holloway sd. 5,596-5,604 ft.; set 9⅝-in. csg. 5,580 ft.; did not test Holloway sd. ton Bodcaw sd. 8,165 ft.; top Davis sd. 8,479 ft.; cutting stk. D.S. 6,118 ft.

Hunt Oil Co. No. 21 Hope, C NE SW Sec. 13-21-10. Holloway sd. 5,768-89 ft.; 9⅝-in. csg. 5,751 ft.; T.D. 5,871 ft. comp.; 43 B.P.H.; ⅜-in. ck.; T.P. 800 lbs.; C.P. 1,200 lbs.

Hunt Oil Co. No. 1 Pardee, sec. 24-21-10. Set 13⅜-in. csg. 797 ft.; drlg. sh. 7,849 ft.

Hunt Oil Co. No. 1 Sandifer, C NE NE Sec. 4-20-10. No Holloway sd. yet; set 9⅝-in. csg. 5,730 ft.; drlg. sh.&L. 6,-964 ft.

Magnolia Pet. Co. No. 1 Merritt Unit, C SW NW Sec. 14-21-10. Top Tr. Pk. 5,-715 ft.; no Holloway; 9⅝-in. csg. 5,-850 ft.; drlg. sh. 5,988 ft.

Magnolia Pet Co. No. 1-C Pardee, C NW NE Sec. 17-23-11. Rmd. and set 9⅝-in. csg. 5,920 ft.; T.D. 6,025 ft.; tstd. dry 6,025 ft.; treated with 5,000 gal. acd. and tstd. S.S.O.&S.W.; mudded up hole; retstd. small S.O. after raising tbg.; cd. 6,025-28 ft.; rec. 1 jt. showed stain and odor oil; tstd. dry sd.; S.G. top Tr. Pk. 6,054 ft.; drlg. rd. sh. 6,640 ft.

Midstates Oil Corp. No. 1 Welori Lbr. Co. Unit, NE cor. NW sec. 3-20-10. Set 8⅝-in. csg. 6,265 ft.

Harry Morgan No. 2-A Hope, C SE SW Sec. 24-21-10. Drlg. sh. 7,719 ft.

Ohio Oil Co. No. 1 W. Cox, Acct. 2, SE cor. SW Sec. 15-21-10. Drlg. sh. 5,000 ft.

Oliphant Oil Corp. No. 1 Fred Banks, C SE NW Sec. 2-20-10. Drlg. sh.&anhy. 4,783 ft.

Oliphant Oil Corp. No. 1-B Stewart, C NW NE Sec. 5-20-10. Top Tr. Pk. 6,-117 ft.; Holloway sd. 6,160-87 ft.; 9⅝-in. csg. 5,884 ft.; drlg. sh.&sd. 7,366 ft.

Oliphant Oil Corp. No. 2-B Stewart, C NW NW Sec. 4-20-10. Drlg. sh.&anhy. 4,965 ft.

Union Prod. Co. No. 2 Stewart, SW SW Sec. 28-21-10. Drlg. sh. 5,704 ft.

SOUTH LOUISIANA FIELDS

Abbeville—Vermilion Parish

Continental Oil Co. No. 1 Franciol, sec. 67-12s-3e. Drk.

Anse La Butte—St. Martin Parish

Louisiana-Crusader No. 3 Central Oil Co., Sec. 86-9s-5e. Abd.; T.D. 421 ft.

Paul Fly et al No. 1 Moresi Oil Co., Sec. 118-9s-5e. T.D. 1,440 ft.; I.P. 26 bbls. 8 hrs.; ¼-in. ck.

Bateman Lake—St. Mary Parish

Texas Co. No. 1 Wax Bayou, sec. 21-16s-12e. Drlg. sh.&shlls. 10,004 ft.

Baton Rouge—East Baton Rouge Parish

Wm. Helis et al No. 2-A La. State University, Sec. 66-7s-1w. T.D. 7,596 ft.; abd.

Wm. Helis No. 1 Harry Nelson, sec. 36-7s-1w. Cd. oil sd. 6,477-6,500 ft.; T.D. 7,710 ft.; D.P. stk.; P.B.; sdtrkd.; T.D. 6,480 ft.; 7-in. csg. 6,422 ft.; flwg.; no ga.

Bay St. Elaine—Terrebonne Parish

Texas Co. No. 4 State-Bay St. Elaine, Sec. 19-23s-20e. Drlg. sh. 6,631 ft.

Bayou Blue—Iberville Parish

Humble O. & R. Co. No. 8 Wilberts, Sec. 66-9s-11e. Drlg. sh. 3,842 ft.

Bayou Choctaw—West Baton Rouge

La. Crusader Oil Co. No. 3 Schwing, sec. 29-8s-11e. Drlg. sd.&L. 8,204 ft.

Standard Oil Co. et al No. 1 Marley Cypress Co., Sec. 29-8s-11e. Drlg. L. 7,-991 ft.

Bayou Des Allemands—St. Charles Parish

Amerada Pet. Corp. No. 1 Gheens Realty Co., sec. 56-15s-20e. T.D. 7,021 ft.; D.P. stk.; P.B. to 5,000 ft.; sdtrkd. at 5,000 ft.; drld. to 6,984 ft.; 9⅝-in. csg. 6,982 ft.; drlg. sh. 8,001 ft.

Amerada Pet. Corp. No. 2 St. Charles Ld. Co., sec. 13-15s-20e. T.D. 8,500 ft.; 9⅝-in. csg. 8,518 ft.; top salt 9,294 ft.; T.D. 9,295 ft.; P.B. 8,999 ft.; W. O.C.; set 680 ft. of 5½-in. csg. 8,997 ft.; perf. csg. 8,900-20 ft.; tstd. oil and S.W.

Big Lake—Cameron Parish

Union Sulphur Co. No. 1 Hebert, Sec. 18-12s-8w. T.D. 9,960 ft.; W.O.C.

Caillou Island—Terrebonne Parish

Texas Co. No. 4 State-Terrebonne Bay, Sec. 19-23s-20e. Loc.

Texas Co. No. 29 State, sec. 17-23s-20e. Rig.

Texas Co. No. 53 State, Sec. 18-23s-20e. Top salt 5,875 ft.; drlg. salt 5,976 ft.

Cameron Meadows—Cameron

Burton-Sutton Oil Co. No. 23 School Ld., sec. 16-14s-13w. T.D. 5,786 ft.; 7-in. csg. 5,323 ft.; tstd. S.W.; P.B. to sidetrack; T.D. 2,959 ft.; flwd. oil and sanded up; S.D.

Burton-Sutton Oil Co. No. 26 Sch. Ld., Sec. 16-14s-13w. R.U.

Magnolia Pet. Co. No. 23 Cameron Meadows, sec. 21-14s-13w. Drk.

Charenton—St. Mary Parish

H. J. DeArman No. 1 Oak Lawn Plantation, Sec. 24-13s-10e. Drlg. sh. 5,-649 ft.

Kinsley Oil, Inc., No. 2 Hertel, sec. 21-13s-9e. T.D. 1,133 ft.; 7-in. csg. 1,112 ft.; tstd. S.W.; S.D.

Pan American Prod. Co. No. 9 Veeder, Sec. 11-13s-9e. T.D. 1,841 ft.; 7-in. csg. 1,830 ft.; tstd. S.W.; dpnd. to 1,905 ft.; tstd. S.W.; P.B. 1,836 ft.; tstg.

Pan American Prod. Co. No. 10 Veeder, Sec. 11-13s-9e. Loc.

Creole—Cameron Parish

Superior Oil Co.-Pure Oil Co. No. 3 State-Gulf of Mexico. T.D. 2,458 ft.; rep. rig; driving more piling.

Darrow—Ascension Parish

Darrow Oil Co. No. 1 Dennis, sec. 68-10s-2e. T.D. 5,750 ft., stky. sh.; T.A.

Humble O. & R. Co. No. 1-B Community, Sec. 49-10s-2e. T.D. 7,930 ft.; P.B. 4,-416 ft.; drld. out to 4,431 ft.; 5½-in. csg. on bttm.; perf. csg. 4,350-62 ft.; swbd.; no results; perf. csg. 4,354-60 ft.; tstd. wtr.; abd.

Kiva Oil Co. No. 1 Duplessis, sec. 69-10s-2w. S.D. 2,523 ft.

Southern Drillers, Inc. (D. J. Simmons) No. 1 August Berteau, sec. 55-10s-2e. T.D. 7,744 ft.; 5½-in. csg. 7,684 ft.; tstd. S.W. 7,596-7,608 ft. and 7,402-06 ft.; P.B. 6,375 ft.; perf. csg. 6,366-70 ft.; tstd. S.W.; abd.

Fausse Point—Iberia Parish

Texas Co. No. 5 State Lake-Faüsse Point, Sec. 35-11s-8e. Driving piling.

Four Isle—Terrebonne Parish

Texas Co. No. 10 State, sec. 24-21s-16e. T.D. 9,243 ft.; 9⅝-in. csg. 6,775 ft.

Gibson—Terrebonne Parish

Shell Pet. Corp. No. 1 Kuntz, sec. 40-17s-15e. T.D. 10,752 ft.; P.B. 9,178 ft.; 5-in. csg. 9,178 ft.; tstd. S.W. 9,093-95 ft.; tstg. at 8,880-85 ft.; showed S.W.; P.B. 8,870 ft.

Garden Island—Plaquemines Parish

Texas Co. No. 28 State, sec. 100-23s-38e. Top salt 6,775 ft.; T.D. 6,777 ft.; salt; 7-in. csg. 5,048 ft.; perf. csg. 4,940-75 ft.; test failed; perf. csg. 4,765-95 ft.; tstd. gas; P.B. 4,274 ft.; perf. csg.

Grand Bay—Plaquemines Parish

Gulf Ref. Co. No. 2 Grand Prairie Lve., sec. 48-20s-18e (1,320 ft. W of No. 1). Cg. sdy. sh. 6,148 ft.; sdy. sh., oil odor.

Gulf Ref. Co. No. 1 State-QQ, Sec. 6-20s-19e. Loc.

Hackberry—Cameron Parish

Berry Oil Corp. No. 1 Cora E. Lyons, sec. 28-12s-10w (West Hackberry). T.D. 3,535 ft.; 7-in. csg. 3,445 ft.; perf. csg. 3,375-82 ft.; W.O.S.R.

Darryl Davis No. 1 Bicktord, sec. 39-12s-10w. T.D. 2,873 ft.; top sh., L., and brkn. cap; S.O. 2,792 ft.; 5-in. csg. 2,778 ft.; T.D. 2,873 ft.; cleaned hole; set cmt. retainer at 2,765 ft.; drld. out to T.D. 2,877 ft.; tstd. S.W.; S.D.

Gulf Oil Corp. No. 1 Noble, sec. 22-12s-10w. T.D. 3,201 ft.; P.B. 2,830 ft.; W. O.C.; to sdtrk. jnk.; fsg.; P.B. 2,830 ft.; sdtrkd. 1,121 ft.; T.D. 3,215 ft.; 7-in. csg. 3,196 ft.

Stanolind O. & G. Co. No. 12 Carter, Sec. 22-12s-10w. Drlg. sh. 2,595 ft.

Superior Oil Co. No. 1-C Dorrisse, Sec. 30-12s-10w. Drlg. sd.&sh. 5,298 ft.

Texas Co. No. 24-B State, sec. 12s-9w. T.D. 8,052 ft.; sdtrkd.; T.D. 8,163 ft.; 7-in. csg. 8,050 ft.; perf. csg. 7,903-16 ft.; tstg.

Union Sulphur Co. No. 7 Hanzen, sec. 13-12s-10w. T.D. 4,165 ft.; fsg.

Horseshoe Bayou—St. Mary Parish

Texas Co. No. 2 State, sec. 37-17s-9e. Drlg. sh.&L. 10,371 ft.

Jeanerette—St. Mary Parish

Herton Oil Co. No. 1-A Roane Sugar Co., sec. 38-13s-9e. T.D. 10,645 ft.; milling to sdtrk. stk. D.P.; sdtrkd. 10,253 ft.; S.D. 10,615 ft.; perf. csg. 10,598-10,612 ft.; tstd. S.W.; P.B. 10,514 ft.; perf. csg. 10,466-80 ft.; tried to blow out; no recovery.

Jefferson Island—Iberia Parish

Texas Co. No. 1 State-Lake Peigneur, Twp. 12s-5e. Top salt 3,642 ft.; base salt 3,741 ft.; drlg. L.&pyrites 6,345 ft.

Jennings—Acadia Parish

F. W. Bennett Oil Corp. No. 1 Grace, Sec. 45-9s-2w. Drlg. gbo. 1,580 ft.

W. T. Burton No. 6 Roboria, sec. 41-9s-2w. 7-in. csg. 6,721 ft.; fsg. tbg.; T.D. 6,997 ft.; prep. to sdtrk.

Cosmo Pet. Co. No. 1 Jennings-Clement, sec. 46-9s-2w. T.D. 3,552 ft.; sdtrkd.; T.D. 3,581 ft.; fsg.

Frio Oil Co. No. 2 Gulf fee, sec. 45-9s-2w (NW flank). 10¾-in. csg. 1,512 ft. drlg. sdy. sh.&L. 6,805 ft.

Frio Oil Co. No. 4 Iowa-Jennings, sec. 45-9s-2w. T.D. 6,687 ft.; P.B. 4,300 ft. T.D. 6,170 ft.; twisted off drill collar; fsg.; sdtrkd. 5,550 ft.; drlg. sh.&L. 6,-708 ft.

Glassell & Glassell No. 6 Trushell, sec. 42-9s-2w. Drlg. sh. 5,400 ft.

Guaranty Oil Co. No. 1 Rowson & Haber, Sec. 46-9s-2w. T.D. 3,403 ft.; run csg.

Gulf Oil Corp. No. 40 Arnaudet, sec. 48-9s-2w. Drlg. sdv. sh. 2,927 ft.

L. & L. Oil Co. No. 2 Houssiere Latrelle, Sec. 47-9s-2w. Drlg. gbo. 2,096 ft.

Ladak Oil Co. No. 6 Jennings, Sec. 46-9s-2w. T.D. 1,040 ft.; W.O.S.R.

Ladak Oil Corp. No. 7 Jennings, Sec. 46-9s-2w. Loc.

Pet. Heat & Power Co. No. 1 Iowa-Jennings, sec. 45-9s-2w. T.D. 3,995 ft.; P. B. 1,774 ft.; tstd. S.W.; S.D.

Pet. Heat & Power Co. No. 2 Iowa-Jennings, sec. 45-9s-2w. T.D. 2,167 ft.; P. B. 1,595 ft.; 5½-in. csg. 1,585 ft.; S.D.

Shell Pet. Corp. No. 4 Community, sec. 40-9s-2w. T.D. 6,675 ft.; perf. csg.

Superior Oil Co. No. 4 Clement, sec. 46-9s-2w. T.D. 6,546 ft.; 7-in. csg. 6,494 ft.; flwd. oil; started making gas; killed; sdtrkd. 6,146 ft.; drlg. sh. 6,-163 ft.

Superior Oil Co. No. 8 Jennings-Haywood, Sec. 41-9s-2w. R.U.

Superior Oil Co. No. 15 Leckelt, Sec. 42-9s-2w. R.U.

Three Sands Oil Co., Sec. 46-9s-2w. T.D. 1,736 ft.; run csg.

Victor Weisse No. 1 Clement, sec. 46-9s-2w. 6⅝-in. csg. 3,032 ft.; T.D. 3,255 ft.; sdtrkd.; drlg. sh. 3,154 ft.

Lafitte—Jefferson Parish

Carter-Perrin & Brian No. 1 Lucien, Adams, Sec. 9-17s-24e. Drlg. sd.&sh. 4,655 ft.

Texas Co. No. 12 LaFitte, Sec. 20-17s-24e. Drlg. 112 ft.

Texas Co. No. 3 Madison Realty Co., sec. 17-12s-24e. T.D. 10,155 ft.; 7⅝-in. csg. 10,034 ft.; perf. csg. 10,086-10,106 ft.; I.P. 1,388 B.P.D.; ⅝-in. ck.

Texas Co. No. 3 Marrero Ld. Co., sec. 29-17s-24e. Drlg. sh. 9,863 ft.

Texas Co. No. 10 Rigolet Cooperative Fur Co., Sec. 28-17s-24e. Drlg. sdy. sh.&L. 8,753 ft.

Lake Barre—Terrebonne Parish

Texas Co. No. 42 State-Lake, sec. 40-21s-19e. Drlg. sdy. sh.&L. 10,898 ft.

Lake Pelto—Terrebonne Parish

Texas Co. No. 21 State, sec. 8-23s-18e. T.D. 6,058 ft.; P.B. and sdtrkd.; T.D. 5,761 ft.; PB. 5,536 ft.; to sdtrk.; T.D. 6,048 ft.; P.B. and sdtrkd. 5,100 ft.; T.D. 6,041 ft.; P.B.; sdtrkd.; drlg. sh. 4,453 ft.

Texas Co. No. 22 State, Sec. 8-23s-18e. Bldg. drk.

Lake Hermitage—Plaquemines Parish

Gulf Ref. Co. No. 8 Lafourche, sec. 11-18s-25e. Drlg. hd. sh. 2,664 ft.; 10¾-in. csg. 967 ft.; drlg. sdy. sh. 4,305 ft.

Leesville—Lafourche Parish

Wm. Helis No. 1-A City of New Orleans, Sec. 35-21s-22e. Drlg. sdy. sh. 8,440 ft.

Texas Co. No. 7 Leeville, sec. 27-21s-22e. Drlg. sd. 6,727 ft.

Lirette—Terrebonne Parish

Humble O. & R. Co. No. 1 Robert Verret, sec. 32-19s-19e. Drlg. hd. sd.&gvl. 1,876 ft.; 20-in. csg. 296 ft.; 13⅜-in. csg. 3,164 ft.; cd. oil sd. 8,463-65 ft.; 9⅝-in. csg. 9,056 ft.; T.D. 10,250 ft.; rmg.

Lockport—Calcasieu Parish

La. Crusader Oil Co. No. 1 Milam Stieker, sec. 6-10s-9w. Drlg. sh. 1,828 ft.; 10¾-in. csg. 1,028 ft.; drlg. S.W. sd. 8,234 ft.

Magnolia Pet. Co. No. 23 Miller, sec. 9-10s-9w. T.D. 7,952 ft.; P.B. 6,774 ft.; tstd. S.W.; P.B. 4,363 ft.; swbg.

T. C. Markley No. 1 Farquhar (offset Continental No. 1 J. H. Moss). Drlg. sdy. sh. 5,090 ft.

Lake Long—Lafourche Parish

Fohs Oil Co. No. 5 State-Lake Long, sec. 64-17s-19e. Drlg. sh. 2,764 ft.; 13¾-in. csg. 2,761 ft.; 9⅝-in. csg.; T.D. 9,-398 ft.; oil sd. 9,342-98 ft.; cg. sh. 9,-465 ft.

New Iberia—Iberia Parish

H. Fotiades No. 7 Gulf Ld., sec. 25-12s-7e. Drk.

Wm. Helis No. 6 Schwing, sec. 56-12s-7e. Salt 3,949-50 ft.; P.B. 1,850 ft.; T.D. 3,938 ft.; trying to sdtrk. at 3,-872 ft.; T.D. 5,352 ft.; sdtrkd.; drlg. sdy. sh. 4,547 ft.

Texas Co. No. 5 Bryant, Sec. 25-12s-7e. Drk.

Texas Co. No. 2 Clemente Hebert, sec. 25-12s-7e. 10¾-in. csg. 844 ft.; drlg. sdy. sh.&L. 4,444 ft.

Texas Co. No. 8 Duke, Sec. 26-12s-7e. Drlg. sh. 5,530 ft.

Texas Co. No. 1 Gonsoulin, Sec. 13-12s-7e. Drlg. sh. 1,260 ft.

North Crowley—Acadia Parish

Humble O. &. R. Co. No. 1 H. J. Thevis, Sec. 34-8s-1e. Drlg. sh. 6,965 ft.

Port Barre—St. Landry Parish

Pan American Prod. Co. No. 3 Garland, Sec. 4-6s-5e. 16-in. csg. 90 ft.; T.D. 5,448 ft.; run 7-in. csg.

Pan American Prod. Co. No. 1 Rene Nezal. Drk.

Y. D. Spill No. 1 Gaudet, sec. 4-6s-5e. T.D. 4,165 ft.; rmg.

Potash—Plaquemines Parish

Humble O. & R. Co. No. 36 Orleans Lve. Bd., Sec. 14-18s-15e. T.D. 10,027 ft.; abd.

Quarantine Bay—Plaquemines Parish

Gulf Oil Corp. No. 1-A Orleans Levee Bd., Sec. 18-19s-17e. T.D. 8,176 ft.; rmg.

Gulf Ref. Co. No. 4 State, sec. 17-19s-17e. T.D. 11,014 ft.; P.B. 10,978 ft.; tstd. S.W.; P.B. 10,780 ft.; perf. csg. 10,745-60 ft.; made sqze. job 10,060-70 ft.; perf. csg. 9,685-90 ft.; tstd. S.W.; P.B. 8,921 ft.; perf. csg. 8,994-9,006 ft.; tstd. S.W.

Gulf Ref. Co. No. 5 State, sec. 17-19s-17e. Loc.

Gulf Ref. Co. No. 6 State, sec. 17-19s-17e. Driving piling.

Raceland—Lafourche Parish

Amerada Pet. Corp. No. 1 Godchaux Sugars, Inc., sec. 34-15s-19e. 18⅝-in. csg. 262 ft.; T.D. 11,312 ft.; 7-in. csg. 11,312 ft.; S.D.

Amerada Pet. Corp. No. 2 South Coast Corp., Sec. 35-15s-19e. T.D. 12,200 ft.; 4¾-in. csg. 10,189 ft.; P.B. 12,164 ft.; fsg.

Tide Water Oil Co. No. 1-A South Corp., Sec. 34-15s-19e. T.D. sh. 3,937 ft.

Sorrento—Ascension Parish

Pan American Prod. Co. No. 14 United Ld. Co., Sec. 15-10s-4e. Drlg. gbo. 1,-100 ft.

Sorrento Pet. Corp. No. 2 White, sec. 22-10s-4e. S.D. 105 ft.

South Roanoke—Jeff Davis Parish

Continental Oil Co. No. 1 Joe Sturdivant, Sec. 36-10s-4w. Drlg. sh. 11,715 ft.

Union Sulphur Co. No. 2 T. R. S. Farms, sec. 23-10s-4w. Sh. 9,736 ft.; cmtd. 7-in. csg. 8,888 ft.; drlg. sh. 10,456 ft.

Starks—Calcasieu Parish

Lutcher-Moore Co. No. 5 fee, sec. 19-9s-

12w. T.D. 4,153 ft., salt; P.B. 3,987 ft.; 7-in. csg. 3,827 ft.; bailed dry; S.D. 3,857 ft.

J. R. Turnbull No. 1 Industrial Lbr. Co., sec. 19-9s-12w. Top salt 2,270 ft.; S.D 2,273 ft.; P.B. 1,150 ft.; sdtrkd.; T.D. 3,515 ft., salt; abd.

Timbalier Bay—Lafourche Parish

Gulf Oil Corp. No. 4 State, sec. 36-23 21e. T.D. 7,373 ft.; T.D. sdtrkd. hole 6,231 ft.; fsg.; P.B. and sdtrkd. 3,501 ft.; T.D. 6,545 ft.; drld. by jnk. to 6,668 ft.; P.B.; 7-in. csg. 6,651 ft.; top salt 7,224 ft.; T.D. 7,268 ft., salt.

Valentine—Lafourche Parish

Wm. Helis No. 3 Valentine Sugars, Inc., Sec. 2-17s-30e. T.D. 7,403 ft.; 7-in. csg. 7,374 ft.; I.P. 25 B.P.H.; ¼-in. ck.

Pan American Prod. Co. No. 1 A. Robichaux, sec. 3-17s-20e. T.D. 5,889 ft.; stk. D.S.; P.B. and sdtrkd. 6,313 ft.; drlg. sh. 6,451 ft.

Venice—Plaquemines Parish

Tide Water Asso. Oil Co. No. 1 Bureas Lve. Bd., Sec. 23-21s-30e. Cg. sh. 7,050 ft.

Villa Platte—Evangeline Parish

Continental Oil Co. No. 1 Corell, Sec. 44-3s-2e. T.D. 9,112 ft.; I.P. 472 B.P. D.; ⅛-in. ck.

Continental Oil Co. No. 1 Fontenot, Ludeau-Tate Unit, Sec. 46-3s-2e. Drlg. sh. 6,850 ft.

Continental Oil Co. No. 2 La. Ld. & Imp. Co., Sec. 46-3s-2e. Drlg. sdy. sh. 9,045 ft.

Continental Oil Co. No. 2 Opelousas, St. Landry, Sec. 44-3s-2e. T.D. 9,103 ft.; tstg.

J. R. Hughes Oil Co. No. 1 J. E. Ortego, Sec. 36-3s-2e. T.D. 9,166 ft.

West Gueydan—Vermilion Parish

Pure Oil Co. No. 1 Vermilion Irrig. Co., Sec. 41-12s-2w. Drlg. sh. 6,380 ft.

Woodlawn—Jeff Davis Parish

Union Sulphur Co. No. 1 O. Miller, sec. 7-9s-5w. T.D. 8,918 ft.; 7-in. csg. 8,918 ft.

S. LOUISIANA WILDCATS

Acadia Parish

Atlantic Ref. Co. No. 1 Klumpp, sec. 12-7s-2w. Drlg. sh. 6,956 ft.

P. D. Freeman No. 2 J. E. Settig, Sec. 17-7s-1w. S.D. 894 ft.

Tri Parish Drillers, Inc., No. 1 Paul Stag, Sec. 4-7s-1w. Drlg.

Western Gulf Prod. Co., Sec. 16-10s-1w. Loc.

Avoyelles Parish

Magnolia Pet. Co. No. 1 W. G. Bowden, Sec. 7-2s-4e. Drlg. sh. 4,036 ft.

Beauregard Parish

Humble O. & R. Co. No. 1 Powell Lbr. Co., Sec. 25-3s-8w; (deep core test). Drlg.

Calcasieu Parish

Sun Oil Co. No. 2 Lutcher-Moore, sec. 12-8s-13w. T.D. 2,019 ft.; 13⅜-in. csg. 1,996 ft.; drlg. sd.&sh. 5,736 ft.

Wheeler Oil Corp. No. 2 Sch. Ld., sec. 16-9s-7w. 15⅛-in. csg. 46 ft.; S.D. 641 ft.; T.A.

Cameron Parish

Federal Roy. Co. No. 1 State-Calcasieu Lake, Sec. 34-13s-8w. Drlg. sd.&sh. 1,060 ft.

Humble O. & R. Co. No. 2 K. B. Hanzen, 466 ft. S and E. NW cor. SW¼ Sec. 9-12s-6w. Drlg. sh. 10,580 ft.

Pure Oil Co. No. 2 Calcasieu Natl. Bnk., sec. 18-12s-4w (½ mi. N of No. 1). Drlg. sh.&L. 6,469 ft.

Union Sulphur Co. No. 3 Miami Corp., Sec. 33-12s-8w. (Willow Lake area). Drlg. sh.&L. 8,456 ft.

Concordia Parish

Benedum & McCormick No. 1 L. P. Allen, sec. 35-5n-8e. R.U.

Lafourche Parish

Texas Co. No. 1 La Terre, sec. 1-20s-21e. T.D. 8,898 ft.; 9⅝-in. csg. 8,898 ft. drlg. sd. 9,874 ft.

Texas Co. No. 1 State-Catfish Lake, Sec. 77-19s-21e. Loc.

Orleans Parish

W. T. Burton No. 2-B Faubourg de Montluzin, Sec. 1-10s-13e. Drlg. sh.& L. 6,344 ft.

W. T. Burton No. 1-B R. E. E. de Montluzin, sec. 1-10s-13e. Drk.

W. T. Burton No. 1 State-Lake Pontchartrain, Twp. 10s-13e. T.D. 8,367 ft.; P.B. 7,775 ft.; to sdtrk.

Rapides Parish

J. J. Farrell No. 1 W. P. Aertker, sec. 16-4n-1e. Drk.

E. F. Kalb et al No. 1 Lee Lbr. Co., sec. 9-5n-3e. S.D. 140 ft.

St. James Parish

Continental Oil Co. No. 1 Colonial Sugars Co., Sec. 46-12s-5e. T.D. 9,525 ft., salt; abd.; top salt 9,480 ft.

St. John the Baptist Parish

Shell Pet. Corp. No. 1 Godchaux, sec. 97-11s-7e. Cg. 9,895 ft.

St. Landry Parish

Herton Oil Co. et al No. 1 Thistlephlite Lbr. Co., Sec. 60-4s-4e. Drlg. sh. 6,900 ft.

St. Martin Parish

Shell Pet. Corp. No. 1 Hazel Burdin, Sec. 15-14s-12e. Drlg. sdy. sh. 1,433 ft.

Shell Pet. Corp. No. 1 Jeanerette Lbr. Co., Sec. 14s-12e. T.D. 10,550 ft.; P.B. 6,955 ft.; abd.

Texas Co. No. 6 State Lake Mongoulois, Sec. 10-10s-9e. Drlg. sh. 8,436 ft.

Texas Co. No. 11 St. Martin Ld. Co., Sec. 21-8s-7e. Top salt 8,904 ft.; T.D. 9,404 ft.; 7-in. csg. 8,912 ft.; fsg. for tbg.

St. Tammany Parish

A. P. Portas No. 1 W. C. Forbes, sec. 33-7s-15e Drk.

Terrebonne Parish

Shell Pet. Corp. No. 1 Peters, sec. 73-18s-18e. T.D. 10,172 ft.; making D.S.T.

Texas Co. No. 1 Continental Ld. & Fur Co., Sec. 29-18s-14e. 18⅝-in. csg. 101 ft.; drlg. sh.&shls. 2,554 ft.

Vermilion Parish

Desoto Oil Co. No. 1 Richardson, Sec. 30-12s-4e. Drlg. sh. 4,280 ft.

Stanolind O. & G. Co. No. 2 F. Stovall, Sec. 88-14s-3e. Dredging canal.

TEXAS

Week Ending September 17

GULF COAST FIELDS

Hastings Field—Brazoria County

Humble O. & R. Co. No. 1-G W. F. Beers, Perry & Austin Sur. Drlg. 1,510 ft.

Stanolind O. & G. Co. No. 1-B Moore, L.&G.N. Sur. No. 22. Drlg. sh. 2,030 ft.

Stanolind O. & G. Co. No. 7 Remley, H. T.&B. Sur. No. 28. Drlg. sh.&L. 4,315 ft.

Stanolind O. & G. Co. No. 2-C Cecil Brown, W. H. Snyder Sur. Drk.

Stanolind O. & G. Co. No. 2 P. McDonald, Mary Sloan Sur. Drlg. sd.&sh. 5,037 ft.

Old Ocean—Brazoria County

Harrison & Abercrombie No. 3 Armstrong Plantation, Polley & Chance Sur. Drlg. sh. 8,324 ft.

Harrison & Abercrombie No. 1 Chenault, C. Breen Sur. Cg. 9,896 ft.

Harrison & Abercrombie No. 1 Fisher, and Larsen, C. Breen Sur. Drlg. sh. 7,769 ft.

Harrison & Abercrombie No. 1 R. D. McDonald, C. Breen Sur. Loc.

Sun Oil Co. No. 1 Campbell, Chas. Breen Sur. Loc.

Sandy Point—Brazoria County

Stanolind O. & G. Co. No. 4 Fite, David Talley Sur. Drlg. sh. 2,051 ft.

Stratton Ridge—Brazoria County

Sterling O. & R. Co. No. 1 J. C. Kramer, T. W. Grayson Sur. T.D. 3,695 ft.; P.B. 3,200 ft.; sdtrkd.; T.D. 4,631 ft., salt; 7-in. csg. 4,631 ft.; S.D. 4,960 ft.

West Columbia—Brazoria County

Fros & Dunnam No. 2 Masterson, G. Tennille Sur. R.U.

General Crude Oil Co. No. 1 Campbell Est., J. H. Bell Sur. R.U.

Texas Co. No. 26 Abrams, G. Tennille Sur. P.B. 5,214 ft.; W.O.C.

Texas Co. No. 27 W. H. Abrams, G. Tennille Sur. Drlg. sh. 4,469 ft.

Texas Co.-Sterling O. & R. Co. No. 8 Phillips, Geo. Tennille Sur. 7-in. csg 5,542 ft.

D. M. Wallace No. 3 Smith, G. Tennille Sur. R.U.

Cedar Point—Chambers County

Standard Oil Co. of Texas and Salt Dome Oil Corp. No. 2-118 State, Galveston Bay. Drlg. sh. 2,905 ft.

Cotton Lake—Chambers County

J. R. Turnbull No. 1 Casey, S. Barrow Sur. T.D. 6,539 ft.; 5½-in. csg. 6,525 ft.; perf. csg. 6,460-70 ft. and 6,480 92 ft.; flwd. oil and S.W.; reperf. csg. 6,465-95 ft.; flwd. oil; well went dead; perf. csg. 6,390-6,410 ft.; pulled collapsed csg.; sdtrkd.; T.D. 6,490 ft.; W.O.C.; perf. csg. 6,460-70 ft.; tstg.

Seabreeze—Chambers County

Seabreeze No. 4 Acom, H.T.&B. Sur. No. 103. Drlg. sh. 6,789 ft.

Sun Oil Co. No. 1 Tate, H.T.&B.R.R. Sur. Drlg. sd. 6,788 ft.

Turtle Bay—Chambers County

Stanolind O. & G. Co. No. 1-38 State (6,000 ft. S of field in Turtle Bay).

Greens Lake—Galveston County

Sun Oil Co. No. 2 Houston Farm Dev. Co., D. Buckley Sur. T.D. 7,505 ft.; cmtd. csg. perf. csg. 6,965-85 ft.; flwd. 500 bbls. of fluid, 90% S.W., 10% oil; ¼-in. ck.; perf. csg. 6,806-18 ft.; flwg. slight amt. of dist.; ¼-in. ck.; T.P. 2,800 lbs.; C.P. 1,650 lbs.; tstg.

Hitchcock—Galveston County

N. W. Hunter No. 3 Aarco O. & G. Co., A. Burke Sur. T.D. 5,153 ft.; tstd. oil &S.W.; P.B. 1,149 ft.

Maco Stewart No. 5 fee, J. Spillman Sur. T.D. 5,145 ft.; 5½-in. csg. 5,137 ft.

Bammel—Harris County

H. M. Lawrence and Geo. Lawrence No. 1 C. Ehrkardt, H. Simmons Sur. R.U.

Clinton—Harris County

Stanolind O. & G. Co. No. 2 Edwards Reels & Trobough Sur. Drk.

Stanolind O. & G. Co. No. 2 Paul Weber, Reels & Trobough Sur. Drlg. sh. &shlls. 2,212 ft.

Eureka—Harris County

Jack Frazier No. 1 Emma Helberg, J. Reinerman Sur. R.U.

Jack Frazier No. 2 Emma Helberg, J. Reinerman Sur. Top sd. 7,696 ft.; T.D. 7,737 ft.; tstg.

Jack Frazier No. 2 Hogg Bros., J. Reinerman Sur. Loc.

Jack Frazier No. 1 Lackner, H. Reinerman Sur. T.D. 9,038 ft.; 5½-in. csg. 8,328 ft.; perf. csg. 8,085-95 ft.; flwd. 25 bbls. fluid per hr., 14% brksh. wtr.

Houston Oil Co. No. 3 Helberg & Lackner, J. Reinerman Sur. Loc.

Means & McGehee No. 1-D Laura Lackner, Sec. 3, Shady Acres subd. T.D. 7,720 ft.; run csg.

Fairbanks—Harris County

Amerada-Stanolind O. & G. Co. No. 1 Adell, J. Clarkson Sur. Drlg. sh. 6,253 ft.

Amerada Pet. Corp. and Stanolind O. & G. Co. No. 3 Smith, J. Waugh Sur. Loc.

Amerada Pet. Corp. and Stanolind O. & G. Co. No. 2 Silberg, Geo. Ayers Sur. T.D. 6,853 ft.; perf. csg. 6,845-50½ ft.; flwd. 367 bbls. oil and 55 bbls. S.W.

Bridwell O. & G. Co. No. 1 Gibson, Geo. Ayers Sur. T.D. 6,860 ft.; 5½-in. csg. 6,860 ft.

Gem Oil Co. No. 6 Reid, Geo. Ayers Sur. Drlg. sh. 4,906 ft.

E. M. Halley No. 1 Albert Brown, J. Clarkson Sur. Loc.

D. W. Moore and O'Hern No. 1 Whitehead-Rash, W. S. Powell Sur. T.D. 6,853 ft.; 5½-in. csg. 6,853 ft.

Skelly Oil Co. No. 3 J. H. Emmott, J. Waugh Sur. T.D. 6,840 ft.; perf. csg. 6,834-38 ft.; tstg.

Smith and Ownby No. 4 Gibson, Geo. Ayers Sur. T.D. 6,860 ft.; 5½-in. csg. 6,860 ft.

Stanolind O. & G. Co. No. 1 Schumacker, J. Daswell Sur. Cg. sh. 6,850 ft.

H. E. Williams No. 3 Stern, G. Williams Sur. Spd.

Windsor Oil Co. No. 3 O. E. Parker, J. Waugh Sur. Drlg. sh. 4,534 ft.

Windsor Oil Co. No. 1-B C. D. Ley, Geo. Ayers Sur. T.D. 6,854 ft.; 5½-in. csg. 6,852 ft.; perf. csg. 6,845-50 ft.; S.I.

Friendswood—Harris County

Humble O. & R. Co. No. 19 Beamer, T. Choate Sur. Drlg. sh.&L. 4,177 ft.

Humble O. & R. Co. No. 23 Beamer, T. Choate Sur. Drlg. sh. 2,030 ft.

Humble O. & R. Co. No. 1 J. L. Jones, Perry & Austin Sur. Drk.

Humble O. & R. Co. No. 3 Settegast, T. Choate Sur. Drk.

Humble O. & R. Co. No. 1 E. E. Watson Drk.

H. J. Porter No. 4 Pressly, Peter White Sur. R.U.

Cordele—Jackson County

H. J. Porter No. 1 Woussi, Peter White Sur. Loc

Clam Lake—Jefferson County

Shell Pet. Corp. No. 2 McFaddin, S. A. Pace Sur. T.D. 8,198 ft., salt; top salt 8,156 ft.; 5-in. csg. 5,659 ft.; perf. 5,548-52 ft.; P.B. 3,895 ft.; perf. csg. 3,880-90 ft.; P.B. 3,801 ft.; perf. csg. 3,820-30 ft.; flwg. oil; went dead; pulling tbg.; T.A.

Shell Pet. Corp. No. 3 McFaddin, S. A. Pace Sur. Spd.

Cheek—Jefferson County

Shell Pet. Corp. No. 1 Ed. Pleasant, C. Hildebrand Sur. T.D. 7,726 ft.; tstd oil on D.S.T. 7,711-21 ft.; P.B. 7,725 ft.; flwg. 36 obls. dist. daily through ¼-in. ck.; killed well; perf. csg. 7,717-20 ft.; flwg. 16 B.P.D.; ¼-in. ck.

LaBelle—Jefferson County

Sun Oil Co. No. 4 Broussard-Hebert, B. Blackman Lge. T.D. 8,675 ft.; run csg.

Spindletop—Jefferson County

British American Oil Co. et al No. 1 Gladys City, J. A. Veatch Sur. (deep test SW flank of dome). M.I.M.

Unity Oil Co. No. 1 Greer Noll, J. A. Veatch Sur., Blk. 7, Spindletop Hgts. Subd. (NE flank wildcat). Drk.

Hardin—Liberty County

Commerce Oil Co. No. 1 Roberts, H. B. Johnson Sur. Drlg. sh.&L. 7,335 ft.

Geo. Echols No. 1 West, H. B. Johnson Sur. Drlg. sh. 1,810 ft.

N. C. Ginther No. 1 West, A. B. Hardin Sur. Drk.

Gulf Oil Corp. No. 2 Tullos, H. B. Johnson Sur. Drlg. sh. 3,958 ft.

Humble O. & R. Co. No. 3 W. S. Partlow, H. B. Johnston Sur. T.D. 7,630 ft.; W.O.C.

Shell Pet. Corp. No. 4-A J. H. Cessna, H. B. Johnson Sur. Drlg. 1,800 ft.

Smith & McDannald No. 2 Rives, A. B. Hardin Sur. Drlg. sh. 2,020 ft.

Texas Co. No. 1 Davis, A. B. Hardin Sur. Drlg. sh. 7,488 ft.

Woodley Pet. Co. No. 2 Emma Davis et al, A. B. Hardin Sur. Drlg. sh. 6,830 ft.

McCrosky—Matagorda County

Pierce Est. No. 5 fee, David Fenton Lge. Cd. oil sd. 6,603-04 ft.; run csg.

Bay City—Matagorda County

Hamman Explin. Co. No. 2 Badouh, E. Hall Sur. Drlg. 6,030 ft.

Segno—Polk County

Gulf Oil Corp. No. 3 A. Ragan, L.&G.N. Sur., sec. 15, Cg. sd. 8,084 ft.

Humble O. & R. Co. No. 9-B Kirby, M. Victor Sur. T.D. 8,736 ft.; 7-in. csg. 8,200 ft.

GULF COAST WILDCATS

Brazoria County

Fabriguze et al No. 1 Freeport Sulphur, Stephen F. Austin Sur. (Bryan Mound). M.I.M.

Chambers County

Geo. Anderson No. 1 Julia Casey, W. D. Smith Sur. Loc.

F. A. Gillespie et al No. 1 Kirby Lbr. Co., Chambers Co. Sch. Ld. Sur. R.U.

Salt Dome Oil Corp. No. 1 Ogden, E. Douthit Sur. Spd.

Galveston County

F. J. Anderson No. 1 L. Lobit, Lot A, Subd. No. 6, J. M. Perry and E. M. Austin Lges. Spd.

Harris County

Continental Oil Co. et al No. 1 J. J. Sweeney, Sec. 5, W.C.R.R. Sur. Loc.

H. H. Givens No. 2 F. K. Adone, David Middleton Sur. Drk.

Humble O. & R. Co. No. 1-A Keeler, W. Whitlock Sur. Loc.

Jackson County

Texas Co. No. 1 J. F. Weed, John D. Newell Sur. M.I.M.

Jefferson County

British American Oil Prod. Co. et al No. 1 Gladys City, J. A. Veatch Sur. (SW flank of Spindletop). M.I.M.

Geo. Echols et al No. 1 American Natl. Bnk., J. J. French Sur. Drlg. sh. 7,426 ft.

I. E. Harwell No. 1 State, Gulf of Mexico. T.D. 5,840 ft.; D.S. stk.; pulled in two; [illegible]

Humble O. & R. Co. No. 8-B McFaddin-State, Gulf of Mexico. 7-in. csg. 810 ft. drlg. sh.&L. 2,880 ft.

Liberty County

John G. Mayo, Inc., No. 1 M. E. Roberts, J. F. DeRumayor Sur. 7-in. csg. 40 ft.; drlg. sh. 5,050 ft.

Wallace & Hargrove et al No. 1 J. C. League, M. DeLos Santos Sur. T.D. 5,612 ft.; abd.

Matagorda County

Glenn H. McCarthy No. 1 Nancy Moffett et al, Susan Perkins Sur. 10¾-in. csg. 2,405 ft.; T.D. 9,010 ft.

Ohio Oil Co. No. 1 W. D. Cornelius, P. C. Yarborough Sur. T.D. 7,742 ft.; S. W. sd.; 7-in. csg. 7,759 ft.; perf. csg. 7,727-30 ft.; flwd. 170 bbls. fluid, 15% b.s.&w., 85% 34-grav. oil.

Montgomery County

Deep South Pet. Corp. No. 1 Foster Lbr. Co., Preyor Bryan Sur. 10¾ in. csg. 700 ft.; drlg. sh. 3,840 ft.

Jack Frazier No. 1 Chase Natl. Bnk., D. Garrett Sur. M.I.M.

G. G. M. Oil Co. No. 1 Floyd Oil Co., Lot 62, W.C.R.R. Sur. No. 11. M.I.M.

David D. MacDaniel No. 1 J. C. Fleming, D. M. Gaheen Sur. Temp. S.D. 4,650 ft

Mills Bennett Prod. Co. No. 1 Victoria Griffin, Archibald Lge. Loc.

J. Smith et al No. 1 J. V. Scott, F. A. B. Wheeler Sur. S.D. 380 ft.

Newton County

Republic Prod. Co. No. 1 Sabine Tram, Isaac Garner Sur. (NW Starks Prospect). T.D. 7,032 ft.; abd.

Orange County

Sun Oil Co. No. 1 Lutcher-Moore Lbr. Co., B. Johnson Sur. Drlg. 2,037 ft.

Waller County

Stanolind No. 1 Robertson, H.&T.C. Sur., Sec. 123. Drlg. sh. 2,067 ft.

Stanolind O. & G. Co. No. 1 J. J. Sweeney Est., T. S. Reese Sur. No. 110, 2,640 ft. E. of No. 1 Freeman in Katy gas field. Loc.

Stanolind O. & G. Co. No. 1 Young, T. S. Reese Sur. No. 124, 13⅜-in. csg. 136 ft.; drlg. sh. 7,260 ft.

Washington County

Speed Oil Co. et al No. 1 August Makowsky, D. McIntyre Sur. 10¾-in. csg. 964 ft.; drlg. sh. 4,626 ft.; drlg. 5,006 ft.

Wharton County

Western Gulf Pet. Co. No. 1 Rust, B. Johnson Sur. Drlg. sh. 2,002 ft.

S. W. TEXAS WILDCATS

Aransas County

Housh-Thompson, Inc., et al No. 1 Kent-

Crane, Wm. M. Carper Sur. 10¾-in. csg. 960 ft.; drlg. plug.

Atascosa County

R. C. Stanley No. 1 Schumann, Simon Malone Sur. No. 1069. S.D. 1,300 ft.

Bastrop County

R. C. Franklin No. 2 Yarrington, Jose Manuel Bangs Sur. S.D. 1,725 ft.
Paul Texas and Ashby No. 1 J. T. Grizzard, Andrew Graham Sur. Drlg. L. 6,940 ft.

Bell County

M. M. Gordon No. 1 Steele, Oliver T. Tyler Sur. S.D. 1,185 ft.

Bexar County

M. S. Blackburn No. 1 Miller, Thos. Barwick Sur. No. 324. Drlg. 810 ft.
Frank Gilpin, Jr., No. 1 Nieman, Juan Montes Sur. S.D. 40 ft.
Lewis Ridder No. 1 fee, Jose Maria Baerera Sur. Loc.

Blanco County

D. M. Johnston No. 1 Glasscock, W. W. McDonald Sur. No. 50. 10-in. csg. 150 ft.; S.D. 840 ft.

Caldwell County

R. H. Dye No. 1 Voight, Wm. Watkins Sur. S.D. 1,500 ft.

Calhoun County

Hiawatha O. & G. Co. No. 2 J. J. Roemer, J. Ogsberry Sur. 9⅝-in. csg. 8,005 ft.

De Witt County

Marjo Oil Co. No. 1 W. D. McCurdy, John Hunt Sur. S.D. 150 ft.

Duval County

W. H. Appell No. 1 Hagist, B.S.&F. Sur. No. 265. Drk.
W. H. Appell No. 1 Rogers, El Mesquite gr. S.D. 2,665 ft.
Atlantic Ref. Co. No. 1 Garcia, Sec. 409. Bldg. drk.
James Foster No. 1 Foster, B.S.&F. Sur. No. 268. T.D. 2,320 ft.; abd.
Frank Gravis No. 2 Schallert, Seale, Morris & Seale Sur. No. 255 (Palagana salt dome). S.D. 3,425 ft.
Magnolia Pet. Co. No. 1 Duval Co. Rnh. Co., G.C.&S.F. Sur. No. 267. Drk.
Magnolia Pet. Co. No. 1 Duval Co. Rnch. Co., C.C.S.D.&R.G.N.G. Sur. No. 81. T.D. 2,194 ft.; abd.
E. J. Puri No. 1 Corkill, J. Poitevent Sur. Spd.
Stewart and Nye No. 1 Welder, J. Poitevent Sur. No. 213. Drk.

Edwards County

Evans & Love No. 1 Steve Brown, Blk. 6, G.W.T.&P. Sur. S.D. 6,261 ft.

Frio County

Humble O. & R. Co. No. 1 Schley, Jos. Travaider Sur. No. 174. 15-min. D.S.T. 3,520-51 ft. tstd. no press.; recvd. 175 ft. mud with oil odor and 180 ft. S. W.; 15-min. D.S.T. 3,595-3,617 ft. tstd. 45 ft. of mud, S.S.O.: recvd. 2,500 ft. P.L.O.; D.S.T. 4,720-85 ft.; cg. ahd. in Austin chalk.

Goliad County

Sun Oil Co. No. 1 Lee Homer, John Payne Sur. Cg. sh. 6,619 ft.

Guadalupe County

R. Hamil No. 1 E. J. Zuehl, Vincente Duran Sur. S.D. 450 ft.
A. D. King Rosenbrock, Vincente Duran Sur. Drlg. 756 ft.; no report.
Marts and Beaven No. 1 Glenwinkle, Wakefield and Stewart Sur. R.U.
R. A. Williams No. 1 Weber, Guadalupe Torres Sur. Drlg. 1,118 ft.; no report.

Hidalgo County

R. E. Hardin et al No. 1 E. M. Car. Hidalgo Co. Canal Subd., Lot 8, Blk. 8. Drlg. sh. 5,833 ft.
Phillips Pet. Co. No. 1 Flores (deep test N of Samfordyce field). T.D. 5,860 ft.; cmtd. 7⅝-in. csg. 5,847 ft. (protection string); T.D. 8,121 ft., gas sd.; S.D.
Union Sulphur Co. No. 1 Am.-Rio Grande Ld. & Ir. Co. (Mercedes). Cmtd. 7-in. csg. 8,417 ft.; T.D. 9,618 ft.; 5½-in. lnr. set 8,369-9,618 ft.; tstd. S.W 9,420-30 ft.; made sqze. job; P.B. 9,390 ft.; perf. csg. 9,372-80 ft.; swbd. S.W. and gas; perf. csg. 9,347-52 ft.; tstd. S.W.; perf. csg. 9,255-60 ft.; tstd. S. W.; perf. csg. 9,065-70 ft.; tstd. S.W.; perf. csg. 8,990-9,000 ft.; tstg.
Wheelock & Collins No. 1 Temple Lbr. Co., Lino Cavos, Porc. 57-A. S.D. 6,589 ft.; high wtr.

Jim Hogg County

Henshaw Bros. No. 1 Trevino, L. Ramirez Sur. No. 38. T.D. 3,005 ft.; abd.
Humble O. & R. Co. No. 2 Kelsey Bass, San Rafel Sur. T.D. 3,482 ft.; 10¾-in. csg. 3,469 ft.; T.D. 4,754 ft.; run csg.; tstd. 1,011 ft. P.L.O.; D.S.T. 4,726-54 ft.; 7-in. csg. 4,754 ft.; perf. csg. 4,742-48 ft.; flwd. 37.5 bbls. 8 hrs.; ½-in. ck.; T.P. 1,225 lbs.; C.P. 1,450 lbs.; gas-oil ratio 1,600 to 1.

Jim Wells County

Gulf Board Oil Corp. and Mills Bennett No. 1 Forry, Lavaca gr. T.D. 5,549 ft.; making D.S.T.
H. H. Howell No. 1 Stillwell, Blk. 63, L. G. Collins subd. T.D. 5,300 ft.; tstg.
Humble O. & R. Co. No. 1 Ben Beiltz, Staples Sur. 10¾-in. csg. 1,042 ft.; drlg. sh. 3,212 ft.
Humble O. & R. Co. No. 1 John A. True, Los Presenos de Abajo Sur. 10¾-in. csg. 1,090 ft.; drlg. sh. 5,567 ft.
Magnolia Pet. Co. No. 1 Romano, V. de Garcia Las Animas Sola gr., 1,126 ft. E of discovery well. Cd. sd., gas odor, 6,421-26 ft.; cg. sh. 6,765 ft.
Presnall & Tsesmelis No. 1 Hoffman, Marcellino Lopez Sur. R.U.
Shell Pet. Corp. No. 1 C. H. Von Blucher, Lucinda Best Sur. T.D. 7,318 ft., soft sd.
Smith & McDannald No. 1 Rooney, Casa Blanca gr., Blk. 11. T.D. 6,500 ft.; abd.
Transwestern Oil Corp. No. 1 B. H. Dunlap, Sur. 179-181 (1⅛ mi. SW East Premont field). 18⅝-in. csg. 485 ft.; T.D. 5,107 ft.; sdtrkd.; drlg. sh. 4,360 ft.

Kendall County

Geo. Dorsey No. 1 Flanagan, J. Sweeney Sur. No. 12. S.D. 350 ft.; abd.
Millican and Norman No. 1 Werner, J. F. Torrey Sur. T.D. 909 ft.; bailed oil; 5⅛-in. csg. 907 ft.; drlg. L. 950 ft.
H. N. Reid No. 1 Marguardt, J. Travuso Sur. No. 150½. Loc.

Kerr County

H. C. Starkey No. 1-A Saue, T.W.N.G. R.R. Sur. Drlg. 410 ft.

Kimble County

Phillips Pet. Co. No. 1 Mudge, C.C.S.D.& R.G.N.G.R.R. Sur. No. 9. Drlg. 2,100 ft.
Plateau Oil Co. No. 1 E. E. Bolts, S. Jones Sur. T.D. 1,435 ft.; run csg.
Plateau Oil Co. No. 1 S. J. Davis, N. Mitchell Sur. No. 44. S.D. 170 ft.
Plateau Oil Co. No. 1 Hunger, J. Dujner Sur. T.D. 1,600 ft.; prep. to sdtrk.

Kleberg County

Pure Oil Co. et al No. 1 State Ld., Tr. 68, Laguna Madre Bay, Lse. No. 528. T.D. 9,350 ft.; fsg.

La Salle County

Lake-Tobian Oil Co. No. 1 O'Connor ranch, Blk. 35, Bland & Nelson subd. Spd.

Lavaca County

A. C. McCord et al No. 1 Cora Russek, Blk. 33, J. C. Reynolds Sur. (S of Ezzell). Spd. and S.D.
Midway Oil & Royalty Co. No. 1 Michaleik, S. H. Jack Sur. T.D. 6,272 ft.; abd.

Lee County

Fred Pederson et al No. 1 Brown, David Hudson Sur. Drlg. sh. 3,416 ft.
A. H. Tarver No. 1 J. W. Lawhon, T.D. 3,345 ft., Edws. L.; run 5½-in. csg. to test at 3,300 ft.; recmtd. csg.; W. O.C.

Live Oak County

J. K. Adair No. 1 Schultz Live Stock Co., Wm. J. Pierce Sur. 10¾-in. csg. 20 ft.; drlg. sh. 950 ft.
R. H. Feltner No. 1 Reed, I.&G.N. R.R. Sur. 15. R.U.
Frank Gravis and Mintex Dev. Co. No. 1 Northwest Inv. Co., Uel Ritchie Sur. No. 133. Drlg. 2,237 ft.
Hanna et al No. 2 West, C. O. Ragland Sur. Drlg. sh. 3,537 ft.
Holland Oil Co. No. 1 Wallace, Cameron Co. Sch. Ld. Sur. S.D. 200 ft.
Wellington Oil Co. No. 1 Sanger, T.T.R. R. Sur. 349. Drlg. 2,152 ft.
V. G. Schimmel et al No. 1 Geo. West G. L. Haas Sur. T.D. 210 ft.
Wallace & Jones No. 1 Burrows, Eneas Smith Sur. Drlg. sd. 2,464 ft.

McMullen County

W. T. Kirby No. 1 Chylek, J. M. Hernandez Sur. T.D. 1,210 ft.; D.D.
Scarborough & Bigiane No. 1 Matula Emmitt, Jas. Garner Sur. No. 6. Drlg. 100 ft.; no report.
Wm. Spice, Jr., No. 1 Edrington, A.B.& M. Sur. 57 (5 mi. E. Loma Alto). T.D. 2,519 ft.; run csg.; tstd. 120 ft. oil; D.S.T.

Maverick County

L. M. Lockhart No. 1 Ashbrook, W. J. Phillips Sur. No. 83. Drlg. L. 3,354 ft.
Wellington Oil Corp. and Humble O. & R. Co. No. 1 Indio Cattle Co., Antonio Revas gr. R.U.

Medina County

J. W. Cromwell No. 1 J. W. Tondre, I. J. Rogers Sur. T.D. 1,250 ft.; P.B. 1,080 ft.; cmtd. csg. 1,021 ft.; shot 1,024-80 ft.; T.D. 1,336 ft.; S.D.
A. D. Gaston No. 1 Rogers, Henry Wilson Sur. Drlg. 200 ft.; no report.
L. W. Stieren No. 1 Haegelin, Dolly Smitherman Sur. Drlg. 1,042 ft.; run 5½-in. csg.
Ziegler et al No. 1 Wiemers, F. Thurman Sur. S.D. 905 ft.

Nueces County

Phillips Pet. Co. No. 1 Masten, Blk. 146, Delores I. & A. Co. Sur. Drlg. sh.& L. 950 ft.
Texas Co. No. 1 E. Little et al, Wm. Little Sur. 10¾-in. csg. 1,174 ft.; drlg. plug.
Union Prod. Co. No. 1 Minnie Brown (Agua Dulce area). T.D. 10,768 ft.; prep. to run 7-in. lnr.

Refugio County

I. J. Allen No. 3 Rooke, Jose Miguel Aldrite and Jose Maria Aldrite Sur. (933 ft. SE of No. 2). Loc.
Geophysical Service Co. No. 1 Spaulding, Sec. 3, Aldrete Sur. R.U.
Geophysical Service Co., Inc., et al No. 3 Rooke (LaRosa field), Jose Miguel Aldrete 6¼ Lge. Drlg. 3,300 ft.
J. W. Heard et al No. 1 Hudson, Estaben Lopez Sur. R.U.
Rutherford Oil Corp. No. 1 H. A. Schirmer, Sec. 1, Aldrete Sur. R.U.

Starr County

Hagan and Stewart Oil Co. No. 2 Salinas, La Sarotosa Antonio Canales Salinas Sur. R.U.
Illinois Pet. Co. No. 1 Wilson, Blk. 9, J. J. Welder Sur., Coleman Fulton subd. Drlg. 3,568 ft.
Magnolia Pet. Co. No. 1 Guerra, Santa Cruz gr. (LaReforma field), 1,900 ft. SW of discovery well. T.D. 5,934 ft.; rmg. to make D.S.T.
Massingall and J. R. B. Moore No. 1 Garza, Jose S. Garza Porc. 88. T.D. 2,731 ft.; abd.
Sun Oil Co. No. 1 McKinney, Sur. 242. Tst. 1,300 ft. oil; D.S.T. 4,841-54 ft.; 7-in. csg. 4,859 ft.; perf. csg. 4,853-56 ft.; I.P. 180 B.P.D.; 5/32-in. ck.; T.P. 700 lbs.; C.P. 1,000 lbs.
W. W. Zimmerman et al No. 1 Starr Co. Cattle Co., Juan De La Garza, Porc. 89. T.D. 3,008 ft.; abd.

Travis County

L. G. Priest No. 1 Mazock, J. M. Leavy Sur. No. 5. S.D. 855 ft.
R. F. C. Oil Co. No. 1 Jones, Reube Hornsby Sur. No. 17. 5-in. csg. 1,009 ft.; drlg. L. 1,307 ft.; no report.

Webb County

W. H. Holland No. 1 Bruni, J. V. Borrego gr., C Blk. 76, El Ranchito pasture. R.U.
Lewis Jones No. 1 Bruni, Alberca De Arriba gr. Cg. sh. 3,136 ft.
J. W. O'Byrne No. 1 Lacey, Mary E. Wideman Sur. S.D. 2,515 ft.

Williamson County

F. J. Anderson No. 1 Teichelman Absalam, Jett Sur. Drlg. L. 2,410 ft.; no report.
H. H. Coffield No. 1 Poe, Harrison Owens Sur. S.D. 2,175 ft.
Fritz Fuchs No. 1 Stiles, Jehu Bevil Sur. No. 56. S.D. 1,085 ft.

Wilson County

Stapper Oil Co. No. 1 J. McDaniel, L. Manchoca Sur. S.D. 3,008 ft.

Zapata County

Thompson & Lowe No. 1 Ramirez, Blk 6, Doyle subd. of Porc. 18. T.D. 700 ft.; abd.

EAST TEXAS

(Border Counties)

Cass County

Bateman Drlg. Co. No. 1 Eliza Jaynes, 80-ac. tr., Ambrose Douthet Sur. Sd. 5,500-10 ft.; S.G.; drlg. anhy. 5,557 ft.
Bay Oil Corp. No. 6 Cobb, G. Crowder Sur. 9⅝-in. at 1,056 ft.; drlg. L. 3,535 ft.
Harry Hanbury No. 1 Echols et al, SE cor. Echols tr., Wm. Mayes Sur. Tstd. S.W. and S.O. 5,987 ft.; P.B. 5,967 ft. and W.O.C.; old T.D. 5,987 ft.; drld. out to 5,970 ft.; tstd. S.W.; S.O.; W.O.
Texarkla Oil Corp. No. 1 Mayo, Bryant Holmes Sur. Set 6⅝-in. csg. 6,120 ft.; perf. 6,068-80 ft.; tstd. S.W.; shot formation 6,068-80 ft. with 3 qts. nitro; 1,000 ft. O.I.H.; swbg. to test 6,143 ft.

Marion County—Rodessa

Ark.-La. Gas Co. No. 1 Badgett, Allen Urquhart Sur. Set 7-in. csg. 4,969 ft.; T.D. 5,998 ft.; swbd. and flwd. 340 B.P.D.; swbg. to test.
Ark.-La. Gas Co. No. 4 Holland, Hanks Sur. Set 7-in. csg. 6,050 ft.; acdz. with 3,000 gal acd.; tstd. 13 B.P.H.; ¼-in. ck. and 3,500,000 ft. gas; reacdz.; tstd. 5½ B.P.H.; ¼-in. ck.; T.P. 1,950 lbs.; C.P. 2,050 lbs.; set 5-in. csg.; T.D. 6,090 ft.; perf. 6,058-68 ft. and 6,068-86 ft.; comp.; 171 B.P.D.; ¼-in. ck.; T.P. 474 lbs.; C.P. 700 lbs.; gas-oil ratio 578 to 1.
Ark.-La. Gas Co. No. 1 Hussey, Chas. Lockhart Sur. Drlg. ch. rk. 2,523 ft.
Gulf Oil Corp. and Ohio Oil Co. No. 1 H. Davis, 30-ac. tr., Hanks Sur. 13⅜-in. csg. 131 ft.; drlg. sh. 1,315 ft.
Hollandsworth Drlg. Co. No. 1 H. B. Davis, Wm. Smith Sur. Set 5-in. csg. 5,999 ft.; T.D. 6,026 ft.; comp.; 360 B.P.D.; ¼-in. ck.; T.P. 270 lbs.; C.P. 850 lbs.
Phillips Pet. Co. No. 2 Beard, Bennington Sur. T.D. 6,050 ft.; set 7-in. csg. 6,045 ft.; perf. 5,952-62 ft.; comp.; 435 B.P.D.; ¼-in. ck.; T.P. 400 lbs.; C.P. 1,050 lbs.
Phillips Pet. Co. No. 2 Benefield, J. Hanks Sur. T.D. 6,170 ft.; set 7-in. csg. 6,157 ft.; perf. 6,066-73 ft. and 6,084-87 ft.; tstd. H.F.O.; will not flw.; reperf. csg. 6,062-73 ft. and 6,083-87 ft. and tstg.
Shell Pet. Corp. No. 5 Schluter, Wm. Smith Sur. 5-in. csg. 6,094 ft.; perf. 6,066-82 ft.; tstg. 6,097 ft.
Texas Co. No. 1 Braden, J. M. Fitzgerald Sur. Drlg. sh.&sd. 1,814 ft.

Panola County

Texas Co. No. 1 Claude Adams, T. Cox Sur. Top lower Marine 7,792 ft.; D.S. stk. 11,303 ft.

Sabine County

Hugo Allen No. 1 Brooks, Isaac Low Sur. D.S. stk.; T.D. 5,644 ft.; fsg.

WEST TEXAS WILDCATS

Andrews County

Fuhrman Pet. No. 1 G. O. Ashton, sec. 12, Blk. A-42, P.S.L. Sur. Tstg. 30 B.O.P.D.; on pmp.
Humble O. & R. Co. No. 1-G University, Sec. 18, Blk. 4, University Sur. C.&P.
Olson Drlg. Co. No. 1 Lockhart-Brown, 5 mi. W of south end of Fuhrman pool. P.B. 4,770 ft.; C.O.
Texas Co. No. 1-H University, Sec. 4, Blk. 14, Univ. Sur. Rng. 13-in. 315 ft.
J. W. Tripplehorn No. 1 M. A. Thornberry, Sec. 2, Blk. 42-A. Drlg. 1,610 ft.
H. C. Wheeler No. 1 White-Shelton, Sec. 18, Blk. 36-A, P.S.L. Sur. R.U.R. 150 ft.

Cochran County

Magnolia Pet. Co. No. 1 Della Wright, Lab. 7, Lge. 96, Mills Co. Sch. Lds. Sur. Drlg. 3,776 ft.
Texas Co. No. 1 D. S. Wright, Lge. 115, Lab. 23, Potter Co. Sch. Lds. P.B. 4,410 ft.; prep. treat.

Coke County

Barnett Pet. Co. No. 1 J. R. Mims, sec. 39, Blk. W, T.&P. Sur. S.D. 1,861 ft.

Crane County

Gulf Oil Corp. No. 4 McKnight, sec 8 Blk. B-21, P.S.L. Sur. D.&A. at 6,558 ft.
Gulf Oil Co. No. 2-B State-Lassiter, University Sur., Blk. 30, Sec. 27. Tstg., swbg. 30 B.O.P.D. 3,010-3,113 ft.; fsg. sd. pmp. 3,172 ft.

Crockett County

Short & Gillette No. 1 J. W. Owens, Jose Zunegas Sur. D.&A. 1,993 ft.

Culberson County

Harry J. W. Niehaus No. 1 fee, Blk. 109, sec. 13, P.S.L. Sur. 1,800-ft. test. S.D. 2,500 ft.
Quito Oil Co. No. 1 Cameron Lbr. Co., sec. 24, Blk. 81, P.S.L. Sur. S.D.R. 945 ft.

Dickens County

Bond D. Jones No. 1 Ford et al, I.&G.N. Sur. S.D.O. 2,770 ft.

Ector County

Fields et al No. 1 Owenwood, sec. 6, Blk. 44, T.&P. Sur. Drlg. 1,505 ft.
Sinclair Prairie No. 2-B P. Moss, sec. 40, Blk. 44, T.&P. Sur. P.B. 4,002 ft.; swb. 20 B.O.P.D.

El Paso County

Tri-State Oil Co. No. 1 Kinkel, S.D. 3,571 ft.

Gaines County

Atlantic Refg. Co. No. 1 A. J. & J. J. Parker, Sec. 264, Blk. G. W.T.R.R. Sur. Drlg. 1,540 ft.
Devonian Oil No. 1 King Est., Sec. 6, Lse. 305, Dawson C.S.L. Sur. S.D. fuel 108 ft.

Garza County

Gulf Oil Corp. No. 1 Swanson, sec. 25, Blk. 2, H.&G.N. Sur. Drlg. 7,475 ft.

Hockley County

Gulf Oil Co. No. 2 Mallett, Lge. 34, Labor 25. Prep. treat. at 5,070 ft.
Sid W. Richardson No. 2 Slaughter, Lge. 39, Lab. 58, Maverick Sur. W.O. flwd. 100 B.O.P.D.; T.D. 4,989 ft.
Snowden & McSweeney No. 1 A. A. Slaughter, Zavalle C.S.L. Sur., Lge. 35, Lab. 74. Drlg. 4,430 ft.
The Texas Co. No. 1-B Mallett Lands, Lab. 1, Lge. 52, Scurry C.S.L. Sur. Drlg. 1,927 ft.

Howard County

Anderson & Prichard No. 1 H. Hyman Est., sec. 85, Blk. 29, W.&N.W. Sur. W.O.C. 7-in. 2,092 ft.
Parten & Strickland No. 1 O'Daniel, Sec. 39, Blk. 30, T.&P. Sur. Loc.
W. B. Powell, Trustee, No. 1 Guitar Trust, Blk. A, sec. 17, Bauer & Cockrell Sur. Drlg. U.R. lug 3,012 ft.

Hudspeth County

Haymon Krupp Oil & Ld. Co. No. 1 Thaxton, SE¼ sec. 34, Blk. 74, Twp. 6. Drlg. 4,990 ft.
Haymon Krupp No. 1 Briggs, sec. 24, Blk. 73, Twp. 7, T.&P. Sur. U.R. 4,401 ft.

Jeff Davis County

Joiner Oil Corp. No. 1 Jones-Coffield, S.D. 3,742 ft.

Lynn County

John L. Baldridge No. 1 Alma Lbr. Co., Sec. 151, H.E.&W.T. Sur. Fsg. 4,450 ft.

Menard County

C. D. Haggerty No. 1 Callon, sec. 36, Jim Franz Sur. Jarring on tools; S.G.

Pecos County

E. B. Carruth Tr. No. 1 J. H. Tippett, Sec. 4, Blk. 194, G.C.&S.F. Sur. M.I.M.
Geo. J. Greer No. 1 Price Est., Sec. 3, Blk. 12, H.&G.N. Sur. Drlg. 1,269 ft.
J. N. Gregory et al No. 1 Humble-O'Neil, H.&G.N. Sur., Blk. 10, Sec. 74. Rng. 7-in. 1,285 ft.
Helmerich & Payne et al No. 1 Dow Puckett, Sec. 66, Blk. 3, T.&P. Sur.; 3,500-ft. test. Drk.
Humble O. & R. Co. No. 1 A. H. Robertson, Sec. 27, Blk. OW, T.C.R.R. Sur.; 4,500-ft. test. Bldg. drk.
Magnolia Pet. Co. No. 1 McKee, P.B. 6,197 ft.; P.B. 6,180 ft.; P.B. 5,306 ft. P.B. 1,800 ft.; D.&A. at 6,267 ft.
O. E. Schade No. 1 Neville, Sec. 72, Blk. 194, G.C.&S.F. Sur.; 2,500-ft. test. Drlg. 30 ft.
S. Thompson No. 1 Elsinore Cattle Co.,

Sec. 54, Blk. D, G.C.&S.F. Sur. Drlg. 7,325 ft.
Thomason Prod. Co. No. 1 Notions, Sec. 1, Blk. 105, W.P. Howard Sur. S.D. 363 ft.
Union Oil & Mining Co. No. 1 First Natl. Bnk. of Ft. Stockton, sec. 6, Blk. 9, H.&G.N. Sur. S.D. 1,760 ft.

Reagan County

Culbertson & Irwin No. 1 J. F. Nunn, Sec. 26, Blk. B, L.&S.V. Sur. Drlg. 3,205 ft.

Reeves County

Frankley & Rice No. 1 W. A. Tunstill, Sec. 10, Blk. 56, T.&P. Sur. Drlg. 2,320 ft.
Ohio Oil Co. No. 1 Papham, sec. 18, Blk. 54, T.&P. Sur. Drlg. 3,410 ft.

Runnels County

Castor-Koerner & Goodrich No. 1 Beddo, Subdiv. 41, T. T. Williamson Sur. No. 15½. R.U.S.T.

Scurry County

Coffield & Guthrie No. 1 E. E. Spears et al, sec. 130, Blk. 97, H.&T.C. Sur. Drlg. 3,375 ft.

Sterling County

J. W. Sward No. 1 Brennand, sec. 107, Blk. 2, H.&T.C. Sur. S.D.O. 3,011 ft.

Stonewall County

General Crude Oil Co. No. 1 J. D. Smith, sec. 371, Blk. 2, H.&T.C. Sur., 12 mi. N Rotan. Drlg. 5,085 ft.
Swanson & Parriott No. 1 H. T. Carlisle Sec. 293, Blk. D, H.&T.C. Sur. Pmp. 150 B.O. and 150 B.W.P.D.; T.D. 5,176 ft. Comp. 150 B.O.P.D.

Terrell County

Schermerhorn Oil No. 1 H. P. Allison, sec. 22, Blk. B-2, C.C.S.D. & R.G.N.G. Sur.; 2,500-ft. test. Drlg. 2,098 ft.

Tom Green County

Spinner No. 1 Reed, Mason Ferry Ranch. Sur. Fsg. 5,118 ft.
J. B. Watson No. 1 Llano, C.S.L. Sur., Sec. 16; 500-ft. test. Drlg. 442 ft.

Upton County

White & Wilson No. 1 Webb, Sec. 176, Blk. 1, C.C.S.D.&R.G.N.G. Sur. S.D.; csg. 150 ft.

Val Verde County

A. W. Little No. 1 R. W. Sellers, sec. 34, H.&G.N.R.R. Sur. 1,500-ft. test. Prep. deepen from 200 ft.

Ward County

Herschel M. Jaffe No. 1 Viola Meyers, Sec. 17, Blk. 32, H.&T.C. Sur. M.I. larger mch. 550 ft.
Peerless O. & G. No. 1 F. M. White, sec. 36, Blk. 1, H.&T.C. Sur. D.&A. at 2,276 ft.

Winkler County

S. W. Richardson No. 1-A J. M. Brashara, Sec. 22, Blk. 77, P.S.L. Sur. Drlg. 2,085 ft.
J. R. Sharp No. 1 Sharp-Crume, sec. 7, Blk. B-2, P.S.L. Sur. Fsg. 3,085 ft.
J. R. Sharp No. 2 Sharp-Crume, sec. 7, Blk. B-2, P.S.L. Sur. Loc.

Yoakum County

Honolulu Oil Co. No. 1 R. M. Kendrick, Sec. 825, Blk. D, J. H. Gibson Sur. Drlg. 3,460 ft.
Magnolia Pet. Co. No. 1 Lynn, sec. 770. Drlg. 5,068 ft.
S. C. Yingling et al No. 1 Nettie Barrier, Sec. 6. Drlg. 4,853 ft.

E. C. TEXAS WILDCATS

Anderson County

H. L. Hunt No. 1 Shaw & Cern, D. Parker Sur. S.I. 5,350 ft.

Angelina County

W. C. Atkinson No. 1 So. Pine Lbr. Co., T.&N.O. Sur. No. 14, 9 mi. SW of Lufkin. S.D. 90 ft.
J. C. Bonham No. 6 Cameron Lbr. Co., Cg. 613 ft.

Cherokee County

R. Bunn Drlg. Co. No. 1 Bolin, W. A. Walter Sur., 3 mi. SE of Lone Star; 3,000 ft. E of Bunn No. 2 Bounds. Cg. oil sd. 5,005-07 ft.; S.D.; W.O.

Freestone County

G. Shryock No. 1 M. S. Clark, M. D. Canton Sur., 8 mi. NW of Teague. Drlg. 3,700 ft.

Grayson County

Jim McMurrey No. 1 Dr. T. J. Long, J. Garland Sur., 2 mi. S of Collinsville; 4,000-ft. test. W.O.C. 78 ft.

Gregg County

Humble-Gulf No. 1 Porter Hortor, H. G. Hudson Sur., 3½ mi. SW of Longview; 7,500-ft. test. U.R. 6,818 ft.

Houston County

John G. Mayo No. 1 A. Warroch, J. Sheridan Sur., 1½ mi. E of Procella. Loc.

Kaufman County

Sam Knoerr No. 1 J. B. Hunter, P. Walker Sur., 5 mi. S of Terrell. Drk.
W. S. McGee No. 1 Pritchett, J. Hendricks Sur., 7 mi. W of Mabank. S.D.; 3,104 ft.
J. F. McLaughlin No. 1 Wood-Nash, J. C. Cortez Sur., ¾ mi. SE of Scurry. Drk.
W. G. Martin No. 2 W. G. Martin, W. F. C. Butler Sur., 2½ mi. NE of Kemp. D.&A. 3,549 ft.

Lamar County

Dahl Bros. & Barr No. 2 McQuiston, R. Russell Sur., ½ mi. N of Paris. S.D. 30 ft.

Leon County

Lone Star Gasoline Co. No. 1 Steve Pate, D. J. Haskins Sur., 8 mi. SE of Buffalo gas area. Prep. cg. 5,595 ft.
T. J. Tucker No. 1 Same Vane, James Webb Sur., 4½ mi. SE of Keechi. R.U.R. 100 ft.
Wynne Drlg. Co. No. 1 H. L. Brown, Joseph Brown Sur., ¾ mi. NW of Keechi and on Sinclair Prairie farmout. Fsg. 4,650 ft.

Limestone County

Strowd Gas Co. No. 1 S. Adkins, A. Varella Sur., 1 mi. W of Groesbeck. S.D. 650 ft.

McLennan County

J. C. Kilgore No. 1 Tom Motis, R. D. Price Sur., 4 mi. E of town of West; shallow test. Loc.
Lisle Steele No. 1 C. H. Cherry, M. Martinez Sur., 4½ mi. SE of Waco. S.D. 1,300 ft.

Madison County

W. C. Holleman No. 1 D. C. Cannon, J. P. Phillips Sur., 7 mi. NW of Madisonville. W.O.C. 245 ft.

Navarro County

Silton & Ivey No. 2 Marshall, T. J. Chambers Sur. Loc.
Touhy & Darnes No. 1 G. H. Love, D. W. Collins Sur., 1½ mi. N of Corbett. Loc.

Rains County

McKinley & Hastings No. 1 McTaggert, B. Milder Sur., 1 mi. W of Emory. Loc.

Red River County

Bentley-Sheppard & Stevens No. 1 So. Pine Lbr. Co.: G. S. Parks sur.; 17 mi. N of Clarksville. S.D. 71 ft.
Daniels et al No. 1 J. J. Gaston, J. Guest Sur., 2 mi. S of Detroit. S.D. 1,025 ft.
Walters et al No. 1 Phamplin, W. Moore Sur., 3 mi. SE of Kanawha in NW part of county. S.D. 555 ft.
C. E. Whitehead No. 1 R. H. Ringwald, A. Moore Sur., 1 mi. NW of Manchester. S.D. 630 ft.

Rusk County

Drake Drlg. Co. No. 1 R. L. Needham, J. H. Chambers Sur., 3 mi. S of Laneville. M.I.M.

Smith County

Combest et al No. 1 Dora Kendall; J. Williams Sur., 1¼ mi. SW of Jamestown. S.D. 3,226 ft.

Van Zandt County

W. S. King No. 1 Edna W. Watson, M. G. Whitaker Sur., 5 mi. S of Grand Saline. S.D. 2,200 ft.

TEXAS PANHANDLE

Carson County

Texhoma Nat. Gas Co. No. 1 J. M. Poling, Sec. 30, Blk. Y-2, T.&T. Sur. S.G. 2,914-3,058 ft.; sour gas; drlg. 3,285 ft.

Collingsworth County

White No. 1 Wischamper, S.D. 2,263 ft. Johnson No. 1 Taylor. S.D. 875 ft.

Deaf Smith County

Uscan No. 1 Farwell. S.D. 5,650 ft.

Donley County

Robinson No. 1 Kuteman, Sec. 88, Blk. 20, H.&G.N. Sur. R.U.S.T. 2,840 ft.

Floyd County

Mills Bennett No. 1 Montgomery, F. J. Latham Sur., 6 mi. S of Floydada. S.D. 5,960 ft.

Gray County

Lone Star Gas Co. No. 1 Fowler. S.D. 2,730 ft.
English No. 1 Eudy. S.D. 3,977 ft.

Kent County

B. Dolman et al No. 1 C. V. O'Keefe. Sec. 50, Blk. 1. 15½-in. csg. set at 140 ft.; drlg. at 180 ft. last report.

Lipscomb County

M. C. Tieman No. 1 Spangle, Sec. 626, Blk. 43, H.&T.C. Sur. S.D. 50 ft.

Potter County

Sinclair Prairie Oil Co. No. 1 Bush, Sec. 23, Blk. 6, B.S.F. Sur., about 3 mi. N of Amarillo; 8,500-ft. test. Gas 3,532-50 ft.; circulating.

Roberts County

Whitlock No. 1 Cunningham. Recmt. csg. 2,750 ft.

NORTH TEXAS WILDCATS

Archer County

Helmerich & Payne et al No. 2 L. F. Wilson, Blk. 25, A.T.N.C.L. Sur. Drlg. deeper to 5,129 ft. and W.O.C.
Panhandle Ref. Co. et al No. 1 H. O. Prideaux, A. Rohus Sur. A-1126. T.D. 4,755 ft.; P.B. 3,275 ft.; tstg. S.S.O. 3,690-3,706 ft.
Sinclair Prairie No. 1 J. A. Hood, Blk. 18, A.T.N.C.L. Sur. Drlg. 3,800 ft.

Baylor County

H. F. Wilcox No. 1 J. E. Fritz, D. Barlow Sur. A-10. R.U.R.

Clay County

Walter Gant No. 1 Bryant Edwards, B. C. Beldon Sur. A-12. 6,000-ft. test. 6⅝-in. 5,990 ft.; S.L. 5,994-6,016 ft. T.D. 6,354 ft.; P.B. 6,069 ft. and shot csg.; tstg.

Cooke County

Bin Indian Oil Co. No. 1 Alexander, T. Clevenger Sur., Abst. 1133. Drlg. 1,190 ft.
Sinclair Prairie Oil Co. No. 1 Mrs. J. D. Putnam, T. W. Ward Sur. No. A-1089 B.S.S.O. 4,970-83 ft.; tstg. show oil and S.W.; 9⅝-in. csg. 5,166 ft.; sd. 5,443-48 ft.; test S.W.; drlg. 5,728 ft.

Grayson County

O. L. McDougal No. 1 Jackson, H. Coffee Sur., Abst. 204; 4,000-ft. test. Spud. and S.D.
Mildred Oil Co. No. 1 L. C. Neatherly, Chas. Quillen Sur. S.S.O. 3,972-3,905 ft.; P.B. 3,897 ft.; perf. csg. with 69 shots; S.D.; stg.; est. 200 bbls.; tstg.

Jack County

Benoil Co. No. 1 E. Hagg, Ain. McDonald Sur. A-1135. Drlg. 3,075 ft.
Noan Daves No. 1 K. D. Baker sec. 2709 T.E.&L. Sur. 4,000-ft. test; S.D.O. 2,230 ft.
S. W. King No. 1 Ben Gunter, S. Pritchard Sur. A-459. 3,200-ft. test. Drlg. 1,100 ft.

Knox County

Roeser Pendleton and I.T.I.O. No. 1 G. H. Beavers, Sec. 151, H.&T.C. Sur. Drlg. 3,500 ft.

Montague County

L. T. Burns No. 1 Maggie Mitchell, J. W. Massie Sur. A-463. 4,000-ft. test. Drlg.
H. H. Powell No. 1 Arch Durhan, W. J. Wagoner Sur. A-936. Drlg. 1,570 ft.
Sinclair Prairie No. 1 Hill, Blk. 71, L. C.S.L. Sur. Drlg. 1,550 ft.

Wichita County

Carey & Carey No. 1 J. A. Kemp, Blk. 59, K.W.V.F.L. Sur. Drlg. 3,400 ft.
Continental Oil Co. No. 1 State Ins. Asylum, Blk. 1, Cherokee Co. Sch. Ld. 6⅝-in. 5,075 ft.; SL 5,076-5,128 ft.; drlg plug; flwd. 90 bbls. in 3 hrs.; trtd with 8,000 gal acd.; est. 150 B.P.D.; S.O. 5,344-81 ft.; tstg.

Wilbarger County

Consolidated Oil Co. No. 1 Ancell, sec. 35, H.&T.C. Sur. 10-in. 112 ft.; 6⅝-in. 4,070 ft.; tstg. S.L. 4,080-95 ft.
Phillips Pet. Co. No. 1 M. Servatius, Sec. 78, H.&T.C. Sur., Blk. 14. Spd.

Young County

Homestead O. & G. Co. No. 1 Stephens, M. Dobbs Sur., Abst. 1416. Drlg. 3,665 ft.
Horwitz & Oldom No. 1 C. J. Taach B, sec. 248, T.E.&L. Sur. 6⅝-in. 4,113 ft.; S.D.O. 4,545 ft.
R. V. Tidewell No. 1 J. N. Ivey, F. L. Green Sur., Abst. 105. Drlg. 1,300 ft.
Union Prod. Co. No. 1 Corley, J. F. Clard Sur., Abst. 2202. S.D.O.

Wise County

H. M. Muse No. 1 F. F. Kaker, Blk. 16, Matagorda Co. Sch. Lds. Pits.

WEST CENTRAL TEXAS DISTRICT

Brown County

Hightower O. & R. Co. No. 1 Payne, sec. 31, H.&T.C. Sur. S.D. 1,650 ft.
Whatley No. 1 Browder, C.T.R.R. Sur., Abst. 281. Drlg. 2,370 ft.

Callahan County

Dobbs Oil Co. No. 1 Finley, sec. 75, Bayland Orphans Home Ld. S.D. for test 1,520 ft.
Johnson et al No. 1 B. E. Higgins, Sec. 39, D.&D. Sur., Abst. 886. Loc.

Coleman County

Hoffman & Page No. 1 T. A. Drake, J. H. Woods Sur. No. 46. Drlg. 1,970 ft.
Lynn & Jordan No. 1 Eades, J. West Sur., 7 mi. SW of Santa Anna. S.D. 415 ft.
Bob Murray No. 1 Dibrell, H. Kigan Sur., near Camp Colorado. P.B. 2,393 ft.; O.T.D. 2,865 ft.

Comanche County

Compton No. 1 Griffin, Blk. 2, Comanche Co. Sch. Lds. D.&A. 2,505 ft.
Elmore No. 1 Moorman, sec. 37, D.D.& A. Sur., 3 mi. NE of Sipes Spgs. M. I.M.
Loraine No. 1 Haile, sec. 9, Blk. 3, H. &T.C. Sur. S.D. 2,750 ft.
Sells Pet. Co. No. 1 Smith, sec. 12, Blk 2, H.&T.C. Sur. S.D.; may shoot; est. 25 B.O.P.D.; T.D. 2,798 ft.

Eastland County

Dobbs Oil Co. No. 1 Greer, J. E. Hardy Sur., Ellenburger test. Drlg. 1,740 ft.
Hickok P. & D. Co. No. 1 Penn, Sec. 468, S.P. Sur. Rig.

Erath County

McGee Dev. Co. No. 1 Till Robinson, Wm Ashworth Sur., 2 mi. SE of Desdemona D.&A. 3,215 ft.
Wayne Chandler No. 1 Chandler, J. W. Moore Sur., Abst. 571. S.D.R. 1,319 ft.

Fisher County

S. and D. Daube No. 1 Hardy, Sec. 49, Blk. 2, H.&T.C. Sur. S.D. 3,731 ft.
Forest Dev. Co. No. 1 Morrow, sec. 48 Blk. 2, H.&T.C. Sur. S.D. 4,425 ft.
Owens-Snebold & A. C. Varner No. 1 J. H. Millsap, 3,500-ft. wildcat, 2 mi. NW McCaulley, 330 SL, 330 WL, sec 61-2, H.&T.C. Sur. Drlg. 3,258 ft.
T. G. Shaw Oil Corp. and Texas Co. No. 1 John Stribling, sec. 110, Blk. 3, H.&T.C. Sur. S.D.O. 4,444 ft.

Hamilton County

Wallace & Vickers No. 1 C. C. Lund, J. P. Bailey Sur. 51. S.D. 349 ft.

Haskell County

T. P. Coal & Oil Co. No. 1 Livengood, Pardue pool outpost. Treated; prep. swab.; S.L.M. T.D. 2,811 ft.
Indian States No. 1 Jones, Coryell Co. Sch. Lds. D.&A. 4,208 ft.
Marland Drake No. 1 Cob, J. F. Benson Sur. No. 96. Loc.
Sawyer Drlg. Co. No. 1 A. J. Rowland Est., Sec. 5, Blk. 3, H.&T.C. Sur., 15 mi. E of Stamford. M.I.R.
W. A. Stiles et al No. 1 May Cook, Sec. 89, B.B.B.&C. Sur., 10 mi. W of Stamford; 6,000-ft. test. Loc.

Jones County

Brown Eagle Oil Co. No. 1 Haynes, sec. 191, Lemuel Andrews Sur. U.R. 1,750 ft.
Dunigan Bros. and Fred Hyer No. 1 Gaither, 4½ mi. N of Anson, sec. 38, B.B.B.&C. Sur. Fsg. tools 3,824 ft.
R. B. Farris No. 1 Chas. Donohoo, 220 ft. from S and E lines, N½ sec. 5, B.B.B. &C. Sur. S.D. 2,090 ft.
S. C. Herring No. 1 B. L. Ellis, 330 ft. fr. N and E lines, SE¼ sec. 8-15, T.&P. Sur. Loc.
Humble O. & R. Co. No. 1 Huddleston, Sec. 49, Blk. 18, T.&P. Sur. U.R. 2,800 ft.; S.O. 2,915 ft.
King et al No. 1 Stover, D. H. Stover Sur. No. 7. S.D.O. 1,450 ft.
C. B. Lynn No. 1 C. P. Poe, L. Katz Lee Sur. No. 335. S.D.O. 2,307 ft.
Montray & King No. 2 G. Martinez, Martinez Sur. No. 195. Drlg. 2,365 ft.
Rex Outlaw No. 1 M. A. Moore, Sec. 10, B.A.L. Sur. U.R. 2,002 ft.
Pet. Producers No. 1 McDuff, sec. 32, Blk. 15, T.&P. Sur. Tstg. after shot; sd. 1,894-1,912 ft.
Providence Royalty Co. No. 1 Phillips Est., Subd. 43, Lge. 334, Harrison C. S.L. Sur. Loc.
S. B. Roberts Co. No. 1 Roy E. Prichard, 205 ft. fr. S L, 2,428 fr. E L, J. E. Cockrell Subdiv. 2, G. Martinez Sur. 195. Loc.
Sinclair Prairie No. 1 Williams, sec. 49, Blk. 18, T.&P. Sur. Drlg. 2,110 ft.
Stiles et al No. 1 Cook, Sec. 89, B.B.B. &C. Sur., western part of county. Drlg. 1,760 ft.

Nolan County

Oyster, Harkrider et al No. 1 J. H. Withers, C SW¼ sec. 65-21, T.&P. Sur. Wildcat to drill 4,000 ft. S.D. 4,505 ft.
Chas. E. Peddicord No. 1 Tipton, Sec. 43, Blk. 19, T.&P. Sur. Drlg. 673 ft.
Union Oil Co. No. 1 J. D. Pepper, Sec. 51, Blk. 21, T.&P. Sur.; 5,000-ft. test, 6 mi. SW of Sweetwater. Drlg. 115 ft.

Palo Pinto County

Goble-More Drlg. Co. No. 1 M. B. Costello, R. R. Williams Sur., Abst. 896. U.R. to sand 1,360-72 ft.

Parker County

Brown-Gardner Bros. No. 1 Gilbert, T. &P. Sur., Abst 1958. S.D. 2,175 ft.
Glen Rose No. 1 H. D. Groves, SW¼ Sec. 350, T.&P. Sur. S.D. 605 ft.
Hollenback No. 1 McNav. T.&P. Sur. No. 203, Abst. 1366; 3,500-ft. test. Temp. abd. 960 ft.

Shackelford County

Joe DeGrazier No. 1 Harbough, E central part of county, sec. 1,583, T.E.&L. Sur. 4,500-ft. test. U.R. 3,188 ft.; O.&G. at 3,612-31 ft.
Fox & Rudd No. 1 Shotwell, Sec. 59, B. A.L. Sur. W.O.C. 1,542 ft., P.B. depth.
R. H. Gordon & Frank Pethybridge No. 1 C. B. Snyder, 330 ft. fr. N and E lines, sec. 98, L.A.L. Sur., 4,500-ft. test. S.D.O. 3,620 ft.
J. G. Hammond No. 1 Coker, 1,620 ft. from S line and 1,020 ft. from W line, sec. 159, B.B.B.&C. Sur. Rng. 6-in. 4,280 ft.
Neff et al No. 1 Clausell, E½ Sec. 587, T.E.L. Sur. Loc.

Stephens County

Lone Star No. 1 J. S. McKee, 660 ft. from N line, 660 ft. from W line, sec. 41-7 T.&P. Sur. Trying to S.O. wtr. 3,518 ft.

Taylor County

Charter O. & G. Co. and A. R. Forester No. 2 Frederickson, Guadalupe C.S.L. Sur., Sec. 120, 3 mi. N of View. Drlg 1,400 ft.
T. M. Knoles No. 1 Rowles, Sec. 21, B. A.L. Sur. S.D.O. 1,615 ft.

Throckmorton County

Beacon O. & R. Co. No. 1 Hawes Est., Sec. 979, T.E.&L. Sur. Est. 100 bbls. wtr. with show of oil; T.D. 4,070 ft.
Jones & Stasney No. 1 C. I. Brockman, 330 ft. S line, 330 E line sec. 98, Comanche Indian Sur. T.D. 4,706½ ft.; est. 1,000 to 1,500 B.O.P.D.; acd. 4,711 ft.; ga. 145 B.O. 2 hrs.; trying to S.O. wtr.; T.D. 4,716 ft.; prep. D.D.
Marland-Drake No. 1 Dickie Bros., Center T.E.&L. Sur. 2226. S.D. 4,085 ft.
Stasney et al No. 1 Hunt, sec. 965, T. E.&L. Sur. U.R. 1,628 ft.
Target Drlg. Co. No. 1 E. W. Hunt, Col. Co. Sch. Lds. D.&A. 5,022 ft.

PERSONAL

GEORGE A. VANDERMEER, formerly associated with E. H. MOORE, of Tulsa, has moved to Shreveport, La., and assumed the duties of petroleum engineer with the Phillips Petroleum Company. He succeeds GEORGE R. ELLIOTT, who was transferred to Bartlesville, Okla.

W. C. WRIGHT, certified public accountant and tax consultant, of Ardmore, Okla., will discuss "Taxation of the Stripper Well" at the monthly dinner meeting of the petroleum industry tax representatives of the Kansas-Oklahoma area, to be held Friday of this week in Ardmore. R. M. CHAN, comptroller of the Magnolia Petroleum Company, Dallas, Tex., will speak on "Unemployment Benefits Procedure." An open forum will follow the talks. GEORGE N. OTEY, attorney, of Ardmore, will preside.

WILLIAM BRADY, independent oil operator with offices in Houston, Tex., is in California making a study of drilling operations.

W. M. IRISH, III, vice president of the Atlantic Refining Company, Dallas, Tex., is back from a vacation spent in the Carolinas.

KENNETH M. REGAN, vice president of the Salt Dome Oil Corporation, Houston, Tex., is in Los Angeles on a combination business and pleasure trip.

BART DeLAAT, formerly district foreman for the Gulf Oil Corporation in Seminole, Okla., is now in charge of the Pure Oil Company's engineering department in Illinois.

PAUL R. MARTIN, chief scout for the Pure Oil Company in Fort Worth, Tex., left for a vacation in the Ozark Mountains, accompanied by MRS. MARTIN and their daughter.

ED SHINE, in the accounting department of the Kansas City (Mo.) Gas Company, has been elected commander of Cities Service American Legion Post 181 in Kansas City.

HAROLD CROSBY, chief clerk of the Gas Service Company in Ottawa, Kans., has been transferred to the Joplin, Mo., office to take the place of OLIVER NORMAN, chief clerk there. Mr. Norman goes to Ottawa to take Mr. Crosby's position.

NATHAN CONDRY, superintendent for the Cosmo Petroleum Company in South Louisiana, has been transferred to Refugio, Tex. He is succeeded in Louisiana by J. J. HOOPER, who has been in Refugio for Cosmo and formerly was production superintendent for the Sinclair Oil & Gas Company in the Damon field, Texas.

CARL NICHOLS, formerly scout and landman for the Skelly Oil Company in the Texas Panhandle, is now located in Ardmore, Okla., where he is in charge of the company's land department.

DR. I. A. ANSON, superintendent of the Grandfield, Okla., refinery of the Bell Oil & Gas Company, has been made general manager of the Ben Franklin Refining Company plant at Ardmore, Okla., now being rebuilt to start operations soon.

C. A. RUSSELL has resigned as general superintendent of the Pan American Production Company, Houston, Tex., to go into the oil business for himself. E. V. HEWETT, assistant general superintendent, has been placed in charge of operations pending selection of a successor to Mr. Russell.

DALE ROWDEN, scout for the Shell Petroleum Corporation in the East Texas district, has been transferred to Centralia, Ill.

BEN PILCHER, formerly Panhandle geologist for the Texas Company, has been transferred to Fort Worth, where he assumed the duties of assistant division geologist.

G. H. van SENDEN, vice president in charge of manufacturing of the Shell Oil Company, has retired after 23 years' service. F. S. CLULOW, manager of the manufacturing department, has been named to succeed him. Mr. van Senden will reside at Carmel Highlands, near Monterey, Calif., and will lecture at the Stanford University School of Business. He joined the Shell as superintendent of its Martinez refinery, and much of the planning and engineering which made that plant one of the West Coast's most efficient industrial units was credited to him. Mr. Clulow entered the Shell service in 1920 and soon was made assistant superintendent of the Martinez refinery.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

Oklahoma oil country teamsters, now being paid $5 per day, demand $6 because of the rising cost of living.

Judge Galbreath of Butler County, Pennsylvania, hands down a decision in which he gives the opinion that drilling for oil in a cemetery is not necessarily an act of desecration, and refuses an injunction against the Fisher Oil Co.

Kansas is producing less than 7,000 barrels of oil per day.

Tulsa business associations are suggesting that the name of Tulsa be copyrighted. It is the only city or town of that name in the world, and they wish to keep it exclusive.

20 YEARS AGO

A. V. Bourque, formerly connected with The Oil and Gas Journal, is now president of the American Petroleum Company, with headquarters in Wichita, Kans.

Wade Hampton, long associated with the oil business, dies in South Orange, N. J., at the age of 68 years. He had been with the Standard Oil Company over 20 years.

A new Texas regulation requires the cementing of casing in the Burkburnett pool. T. O. Shappell has been employed by Burkburnett operators to direct the work.

A. C. Beeson, vice president of the Indiana Pipe Line Company, passed away on September 10 at Huntingdon, Ind.

10 YEARS AGO

The Texas Company's 500-mile pipe line from the West Texas to the Gulf will be electrically welded throughout. The pipe joints will be 60 feet long and factory wrapped. Airplanes will be used in making the survey. All these are innovations.

Belmont Quadrangle Company drills to the Oriskany sand in the Allegany field in New York and opens a gas field, around 4,000 feet. The test had been intended for the deeper Medina sand. The discovery is considered of prime importance.

E. E. JACKSON, sales manager for the Atlas Pipe Line Corporation, is back in Shreveport, La., after a vacation spent in the Middle West.

F. E. SEAVER, assistant secretary of the Southern California Gas Company, has been advanced to the position of secretary, succeeding CHARLES L. WHITEHILL, who retired.

CHESTER D. WHORTON, chief geologist and production superintendent of Godfrey L. Cabot, Inc., Olean, N. Y., accompanied by MRS. WHORTON and several friends, is on vacation in Bermuda.

HARRY L. CRICHTON, scout for the Standard Oil Company of Louisiana, accompanied by MRS. CRICHTON, is on a three weeks vacation on the Gulf Coast. They plan to tour the coastal route from Texas to Florida.

I. H. HUGHES, who has been district engineer for Phillips Petroleum Company production department in the Texas Panhandle, has been promoted to engineer in charge of electrical pumping equipment, with headquarters in Bartlesville, Okla.

FRANK LINGAFELTER and BURR WILLIAMS have entered the Illinois oil field as drilling contractors. Mr. Lingafelter formerly was district superintendent for the Ohio Oil Company in McPherson, Kans., and Mr. Williams was a field foreman in that area.

GEORGE MILLER, engineer for the Shell Oil Company in Bakersfield, Calif., and MISS MARJORIE MAUER were married last week. They left for a trip to Honolulu. Mr. Miller is a graduate of the University of Southern California and took his master's degree at the University of Michigan.

PARAGRAPHS

H. H. BRADFIELD, paleontologist for the Texas Company, Fort Worth, Tex., delivered a paper on "Correlation of the Pennsylvanian of Texas and Oklahoma" before the Ardmore (Okla.) Geological Society last Friday at the Dornick Hills Country Club.

H. F. KING, scout for the Transwestern Oil Company of Oklahoma City, was elected president of the Oklahoma division of the National Oil Scouts Association, at the group's annual business session in Oklahoma City last Friday. Mr. King succeeds MAURICE MIESSE, scout for the Phillips Petroleum Company, who has been transferred to the Owensboro, Ky., area. Other officers elected are ED MORGAN, Sun Oil Company, Ardmore, first vice president; CHARLES HEWITT, Mid-Continent Petroleum Corporation, Shawnee, second vice president; DICK SMITH, Sinclair Prairie Oil Company, Enid, secretary-treasurer; HOMER LYNN, seismograph scout for Magnolia Petroleum Company, Oklahoma City, chairman of the executive board.

J. F. REIDY, of the Globe Oil & Refining Company, and M. H. DUTFIELD, Mid-Continent Petroleum Corporation, tied for first low gross score in the fall golf tournament of the Chicago Oil Men's Club at Elmhurst Country Club. Each had 89. First low gross, guest, was won by R. E. JONES, with 79, and second, A. LUECK, 83.

J. L. McMAHON, manager of the West Texas division of the Texas Company, with headquarters in Fort Worth, has obtained leave of absence for the rest of the year and has returned to his home in Wichita Falls. H. S. COLE, JR., has been named acting manager of the division. M. J. Adams, head of the gas and gasoline department, has been named acting assistant manager, retaining his position as head of the gas and gasoline department.

S. R. PARKE, of Warren, Ariz., is back from a vacation spent in oil areas of New Mexico, accompanied by MRS. PARKE. He owns oil properties in the latter state and is interested in several wildcat drillings.

GEORGE F. NICHOLSON, Los Angeles, Calif., has been chosen by the officials of 42 American ports to head the committee of the American Association of Port Authorities which is to carry on the fight against proposed federal confiscation of state-owned tidelands. Mr. Nicholson, IRWIN M. STEVENS, chairman of the Long Beach, Calif., harbor board, and RUSH M. BLODGET, head of the Independent Oil Producers Agency, attended the port convention last week in Halifax, N. S. A resolution opposing claims of federal ownership of tidelands was adopted by the convention.

U. G. NEAL, driller and toolpusher, who has followed exploration and development for oil and gas in Pennsylvania, Ohio, the Mid-Continent and Alaska, is recuperating from a serious illness at his home in Wellsville, Ohio.

W. B. FRASER, W. S. HENDERSON, J. R. HAMMILL, A. J. SCOTT, and FRANK R. WEBSTER, all of Calgary; O. L. REINECKE, Claresholm, and DR. ROBERT MacKENZIE, Vancouver, were elected directors of the Anaconda Oil Company at the annual meeting of shareholders in Calgary, Alberta, Canada.

JOSEPH V. DUNBAR, cable-tool contractor of Tulsa, has rented a residence at St. Elmo, Ill., and will move his family there for the "duration of the Illinois play." Mr. Dunbar has been operating in Illinois pools for the past three months and he expressed the opinion that the state would be a center of active development for a long time.

BURTON BOYE, who is about to retire from the Socony-Vacuum Oil Company, Inc., after 35 years' service with that organization, was presented with a silver cup in token of the esteem in which he is held by friends in the oil industry at a dinner of the New York Fuel Association. The cup was presented by FRED GILBERT, president of the association.

COUNT ALBERTO MARCHETTI DI MAURIAGLIO, Italian minister to Mexico, returned to his post in Mexico City last Friday after a month's vacation in the United States and Cuba, and during a stopover in Houston, Tex., he intimated Mexico is making an effort to develop an Italian oil market. "What else can Mexico do when the usual oil markets are closed to her?" he asked.

Divides His Interest

Friends of A. T. McDannald, Houston, Tex., say his interest is so closely divided between oil operations and collecting curios that it is difficult to say which is his vocation and which is his hobby.

Gittings

A. T. McDANNALD

Mr. McDannald, always known as "Cap," entered the oil business as an independent operator in the Electra, Tex., boom in 1910. He was active in various North Texas fields for the next 10 years. Then he formed a partnership with R. Y. Smith and entered upon a drilling contracting business. The firm drilled the first well at Duncan, Okla., and established its offices there. It moved to Houston in 1934, and most of its work has been in South Texas and coastal Louisiana since then. It has production of its own in the Texas Panhandle, East Texas and Gulf Coast fields.

Mr. McDannald developed a lively interest in relics years ago. His collection of rare pottery, clay figures, American Indian curios, ancient weapons, Aztec Indian handicraft, and strange geological specimens has elicited the praise of connoisseurs. The collection, one of the largest of its kind in private hands, is kept at his headquarters, on a big estate outside the business district of Houston.

A hunting and fishing trip to Wyoming affords yearly relaxation. Born in Mexico, Mo., in 1887, Mr. McDannald graduated from the Iowa Park, Tex., high school. He married Anna Jo Souther. They have six children.

J. H. WHARTON, of the Phillips Petroleum Company's geological staff in Amarillo, Tex., has been transferred to Corpus Christi, Tex.

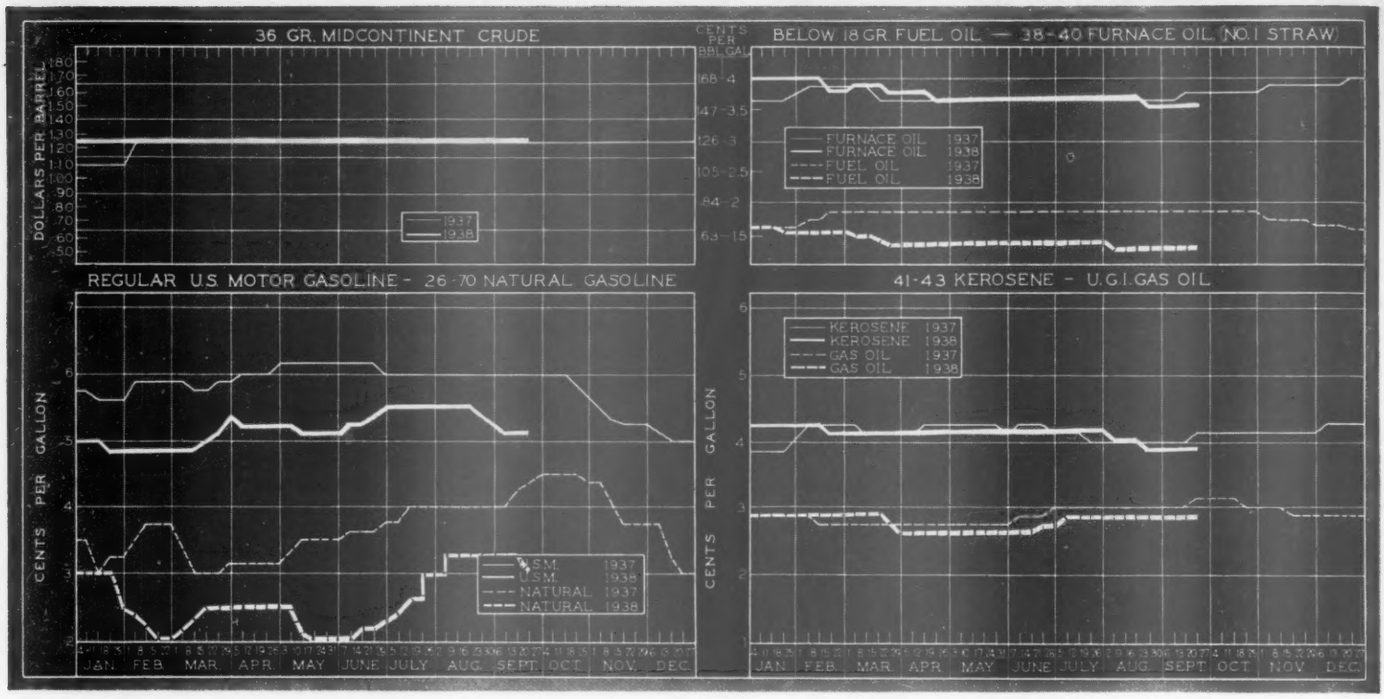
DR. J. BRIAN EBY, independent geologist and operator, has returned to his office in Houston, Tex., following a month's vacation trip to Washington, Baltimore, New York, and other eastern cities.

PROF. GUS N. DYER, economist and humorist, of Vanderbilt University, Nashville, Tenn., will be the speaker Friday evening of this week before the Engineers Club of Tulsa, when it opens its 1938-39 season with a dinner in the Mayo Hotel.

E. R. OSBURN, district superintendent of the Texas-New Mexico Pipe Line Company, now resides in Midland, Tex., following the moving of the company's district office from Junction. The company recently completed the erection of its own one-story office building in Midland.

H. R. LINHOFF, president of the California Natural Gasoline Association, and HOWARD THOMPSON, superintendent of the Rio Bravo, Calif., plant of the Union Oil Company, were speakers last Thursday evening at the opening fall meeting of the Taft chapter of the association. The session was held at the Petroleum Club, in Taft.

J. S. HELM, head of the asphalt department of the Standard Oil Company of New Jersey and president of the Asphalt Institute, will lead discussions of the trend toward lighter construction of highways at the national asphalt conference to be held in Los Angeles, Calif., the week of February 27, 1939. The conference, held under the auspices of the Asphalt Institute, will be attended by highway officials and engineers of every state.



Representative Mid-Continent Quotations on Crude Oil and Refined Products, Basis Oklahoma (Group 3)

Few Bright Spots in Group 3 Market and Some Plants Running at Loss

By T. F. SMILEY

Bright spots were scarce in the Group 3 refinery market this week, and even if you found one something was likely to be wrong with it. It didn't need a mathematician to see that at current prices for petroleum products some refiners were losing money, and the rest felt they were doing well if they broke even. Gasoline, sagging for weeks, was showing no improvement. Although Oklahoma refiners were reported to be sticking pretty close to ruling quotations, gasoline from other areas was being offered on a Group 3 basis at deeply slashed figures.

Low-octane motor fuel in need of quick outlet was said to be obtainable at 3⅞ cents. The volume reported moved at prices like this was small, but it weakened an already wobbly market. Some of the large refiners are adopting the practice they pursued in other times of abnormally low prices, namely buying gasoline instead of making it, saving money that way.

Operations an Endurance Test

Plant operations have become a sort of endurance test. It is regarded as inevitable that refiners without substantial financial resources cannot keep on running indefinitely in such a market as this. Those well entrenched, while deploring the necessity of getting out the red-ink bottle again, declare they would invite more serious loss if they closed than they will if they continue operating. One of the gravest considerations is that of crude connections, which they might have great difficulty in recovering if once given up. There is also the matter of long-time employes, trained in the policies of the company.

Drastic cuts in runs to stills are predicted by some observers, who add that the soundest remedy for current unfavorable conditions lies in that direction. The country's gasoline stocks, which hopeful souls prophesied would drop by next month to the level recorded in October, 1937, offer little promise of fulfilling these forecasts. The prophecies were based on smashing reductions in stocks made from week to week during recent months. But these huge withdrawals, which carried total inventories from 93,192,000 bbls. in March down to 70,514,000 bbls. in the week ending September 3, ceased with the close of the vacation season. Stocks are now about 4,500,000 bbls. heavier than they were a year ago, with small likelihood of the spread being wiped out. Particularly disconcerting in this connection is the fact that the heavy consuming season of 1937 closed with total stocks far above an economic level.

Jobbers were buying furnace oils briskly, and some grades—notably the No. 2, dark and straw—were tight. The No. 3, zero to 15 pourpoint, largely used as a Diesel fuel, was not easy to get. A slightly better tone was observable in range oil, No. 1 prime white, and kerosene, and all three were expected to be stronger marketwise in a week or so.

Further Weakening in Naturals

Natural gasoline, which has been crawling around in the cellar along with motor fuel, exhibited further flabbiness this week, with prices down. Texas material was a half-cent lower than it was a week ago, and though manufacturers said they knew of no Oklahoma natural moving at similarly reduced quotations, it was agreed that any sales in the spot market would have to be in line with the Texas prices. One circumstance that might be interpreted as hopeful was pointed out, namely that a large proportion of such orders as have been received were labeled "Rush." This seemed to be evidence that the buyers had exhausted their supplies and had waited till the last minute before replenishing them. Some observers said a few days of active buying would clean up all distress material.

Lubricants continued laggard. Wax was strong. U. G. I. gas oil, which has been steady for weeks, exhibited increased firmness as colder weather increased the requirements of gas manufacturers.

Refined Oil Market Barometer

Seasonal decline in gasoline consumption diminishes likelihood of country's stocks dropping to economic level unless drastic cuts are made in runs to stills. Brisk demand for heating oils and wax relieves an otherwise laggard market. Signs of mild pickup in heavy industrial oils, depressed for months, are reported. Naturals unsteady, though a faintly improved demand is noticeable.

MID-CONTINENT. Gasoline weak. Heating oils stronger, some grades tight. Naturals down.

EAST COAST. Gasoline lifeless. Mild weather causes slight reaction in heating oil demand.

GULF COAST. Gasoline softer, prices down. Kerosene weak. Burning oils slow.

CALIFORNIA. Softness persists in gasoline, fuel oil, Diesel, gas oil, kerosene, and naturals.

PENNSYLVANIA. Gasoline movement fair. Neutral oils brisk, with some refiners sold up.

CHICAGO. Light heating oils firmer. Gasoline inactive. Heavy industrial oils slightly better.

Between Season Fuel Oil Lull Precipitates Price Shading

By H. STANLEY NORMAN

NEW YORK, Sept. 20.—Spot demand and spot delivery prices for kerosene and No. 2 fuel oil suffered a slight reaction in the northeastern district last week because of prevailing moderate temperatures. In New York City and points south there have been relatively few days yet this fall in which home heating was required.

Reports were current that barge deliveries of No. 2 fuel oil could be obtained at 3⅞ cents per gallon compared to 4 to 4⅛ cents the preceding week. The hesitancy of dealers to lay in large stocks in view of softer crude prices is still in evidence. Most of the domestic service storage is filled in this section in anticipation of furnace operation on short notice. There is the natural lull, however, between early fall and the time when replacement stocks must be delivered. It is this lull in volume turnover that now grips the light fuel oil business in this section and it is precipitating the customary price shading from dealers who in some instances must make room for other material en route to their plants.

A big majority of the domestic fuel oil suppliers, however, are keeping their No. 2 fuel oil quotations firm at 4¼ cents per gallon to tank car customers and at 4⅛ cents per gallon in barges. There appears little possibility of a general break in the light fuel oil market unless the burning season is delayed excessively.

Refiners and distributors of heavy fuel oils took a slightly more optimistic view of conditions last week. It was difficult to determine how much of the newly expressed optimism was based on the possibility of war in Europe, but it was admitted in all directions that such a conflict would vastly stimulate exports of heavy fuels as well as other products. Inquiries reaching suppliers from buyers for such countries as Great Britain, France, Germany and some of the smaller countries indicated they were more interested in locating supplies that could be made available on short notice than in actual orders. The European war tension was doubtless responsible for the changed attitude of refiners who resisted all reported efforts to shade current quotations on spot business. In New York Harbor, Bunker C fuel oil remained unchanged at 95 cents per barrel. Shore plant delivery of industrial fuel was also reported at the highest level of the year, although considerably short of the rate prevailing in the first six or nine months of 1937.

Although most European countries have been importing more petroleum in 1938 than in the preceding year, internal consumption increases have been of such extent that stocks have undergone comparatively little change. Great Britain and France have been gradually building up stocks for military use over a period of several years, but material on hand even in those countries is probably below requirements for entering a major armed conflict. Germany is in much the same position, particularly as regards aviation gasoline. Little of the approximately 30,000 bbls. of synthetic petroleum products currently under production in Germany is suitable for aviation consumption.

There was comparatively little change last week in the motor fuel market along the northeastern seacoast. Adjustments have been made by all companies to make their schedules conform to revisions inaugurated September 9 by Socony-Vacuum Oil Co., Inc., in most of its New England and New York outlets.

The major price conflict at the moment is centered in Philadelphia where retail prices on branded regular grades of gasoline have slipped to as low as 12½ cents per gallon, including 5 cents for taxes. The unbranded grades of motor fuel are available at several Philadelphia stations at 11½ cents per gallon, including taxes.

J. R. Boettcher, president of the Metropolitan Philadelphia Association of Petroleum Retailers, reported that oil companies are skeptical over the constitutionality of Pennsylvania's Fair Trade Act. He said that a petition bearing signatures of about 2,000 Philadelphia dealers had been submitted to major suppliers in which the retail outlet operators asked that Fair Trade Act contracts be made the basis of relations with refiners. In view of the constitutionality question it is unlikely that companies will make any move under its terms until the issue is clarified. There is the fear that antitrust action might follow operations under the act in the event it is eventually declared unconstitutional.

Despite the increase in feeler inquiries the Gulf Coast export market remained without particular feature last week. A cargo of approximately 75,000 bbls. of 67-octane, unleaded gasoline was sold the preceding week for September delivery to Canada at 4⅞ cents per gallon. This was the first motor fuel sale reported in the open market in more than three weeks.

Gulf Coast motor fuel prices were reported trending to lower levels. Shipments of gasoline in the coastwise trade to contract customers in the Middle Atlantic states and to the northeast coast have tapered off considerably since Labor Day, leaving a burdensome accumulation of stocks at certain plants. Low octane motor fuel was available for domestic shipment at most Gulf Coast plants around 4½ to 4⅞ cents per gallon, although some reports indicated the low of this range might be shaded slightly in certain directions. Better grades ranged from 4¾ to 5½ cents per gallon, the high of the spread applying to 70 octane. Light fuel oils were unchanged, according to most reports.

Most Gulf Coast refiners were unwilling to discuss lower prices for domestic grades of light fuels and export gas oil. The attitude was implied that the current slump in delivery orders is a temporary condition and one that will be reversed with a material change in temperature. The attitude of refiners in resisting market pressure is further indication that the light fuel oil stocks, although considerably higher than at the comparable period last year, are still not of major concern.

An element of stability was also detectable in the heavy fuel oil market at Gulf Coast points. Most suppliers were quoting a minimum of 60 cents per barrel for cargo quantities of better grades of heavy fuel and some were 5 to 10 cents per barrel above the minimum.

Reflecting the general market condition of motor fuel in this immediate and surrounding territory, independent distributors of gasoline were reported offering 65-octane material in tankcars at 6¼ cents. Barge deliveries of 65-octane motor fuel in the New York district were available at 6 cents in some directions, but probably a majority of this type of business was transacted at a minimum of 6⅛ cents per gallon. Shipping instructions against Pennsylvania motor oil contracts continued in a satisfactory manner, refiners in the western

(Continued on Page 280)

A. P. I. Weekly Refinery Statistics

Week Ending September 17, 1938

	Capacity reporting (per cent)	Daily crude runs (bbls.)	Total gasoline stocks	Gas oil and fuel oil stocks
East Coast	100.0	477,000	18,502,000	15,388,000
Appalachian	85.9	103,000	2,895,000	975,000
Indiana, Illinois, and Kentucky	89.0	442,000	10,390,000	9,350,000
Oklahoma, Kansas, and Missouri	81.6	267,000	6,123,000	4,508,000
Inland Texas	50.3	120,000	1,672,000	2,020,000
Texas Gulf	88.9	737,000	10,188,000	13,474,000
Louisiana Gulf	97.3	125,000	2,168,000	3,308,000
North Louisiana and Arkansas	55.0	36,000	533,000	888,000
Rocky Mountains	54.2	46,000	1,182,000	844,000
California	90.0	555,000	12,041,000	95,493,000
Total reported	85.5	2,910,000	65,694,000	146,248,000
Estimated unreported	.....	335,000	3,550,000	3,140,000
*Estimated total	.....	3,245,000	69,244,000	149,388,000
*Estimated total, previous week	.....	3,235,000	70,860,000	149,104,000
*September 18, 1937	.....	3,460,000	66,057,000	116,178,000

*Bureau of Mines, currently estimated.

Stocks of Crude Oil in the United States

(BUREAU OF MINES ESTIMATES)

Week ending September 10, 1938	282,457,000 barrels
Week ending September 3, 1938	284,919,000 barrels
Week ending September 11, 1937	309,054,000 barrels

Figures do not include stocks of heavy, unrefinable California crude.

Retail Oil Markets

Tank-wagon and filling station prices on gasoline and kerosene furnished by the larger marketing firms

Prices as of September 20, 1938

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county and city taxes. The gasoline is the regular or standard grade. In most areas lower grades and a premium grade also are available.

Standard Oil Co. (Indiana)

	Gasoline			Kero.
	Tank wag.	Dlr.	Inc. tax	tank-wag.
Chicago, Ill.	15.6	13.6	4.0	10.5
Decatur	15.6	14.1	4.0	10.5
Joliet	15.6	14.1	4.0	10.5
Peoria	15.6	14.1	4.0	10.5
Quincy	15.4	13.9	4.0	10.3
Davenport, Ia.	15.6	14.1	4.0	‡10.5
Des Moines	15.4	13.9	4.0	‡10.3
Mason City	15.8	14.3	4.0	‡10.7
Duluth, Minn.	17.4	15.9	5.0	11.3
Mankato	17.0	15.5	5.0	10.9
Minneapolis	17.0	15.5	5.0	10.9
LaCrosse, Wis.	17.0	15.5	5.0	10.9
Green Bay	17.4	15.9	5.0	10.3
Milwaukee	16.8	15.3	5.0	10.7
Detroit, Mich.	14.3	12.8	4.0	9.0
Grand Rapids	14.8	13.5	4.0	9.7
Saginaw	16.3	14.8	4.0	9.3
Evansville, Ind.	17.1	15.6	5.0	†11.0
Indianapolis	17.3	15.8	5.0	†10.0
South Bend	17.6	16.1	5.0	†9.0
Fargo, N. Dak.	17.2	15.7	4.0	12.1
Minot	18.5	17.0	4.0	13.4
Huron, S. Dak.	17.5	16.0	5.0	11.4
Kans. City, Mo.*	14.9	13.4	4.0	8.5
St. Louis*	15.2	13.7	4.0	10.1
St. Joseph*	14.9	13.4	4.0	9.8
Wichita, Kans.	14.4	10.6	4.0	7.8

*State tax 2 cents, 1-cent city tax and 1-cent federal tax. †Does not include 4-cent state tax. ‡Does not include 3-cent state tax.

Exclusive of state general sales taxes.

Discounts to commercial consumers: On purchases per month off tank-wag. on prices: 1,000 gallons or more, 1.5 cents off; minimum delivery 25 gallons.

Stanolex Fuel Oil in Chicago

Effective August 1, 1938, f.o.b. Chicago tank-wagon prices: Standard range oil, 1-99 gallons, 9 cents; 100-149 gallons, 8.5 cents; 150 gallons and over, 8 cents. Stanolex fuel oil No. 1, 1-149 gallons, 8 cents; 150-399 gallons, 7 cents; 400 gallons and over, 6.5 cents. Stanolex furnace oil, 1-149 gallons, 8 cents; 150-399 gallons, 7 cents; 400 gallons and over, 6.5 cents. Stanolex grade A, 1-399 gallons, 5 cents; 400 gallons and over, 4 cents. Stanolex grade B, 1-799, gallons 5 cents; 800 gallons and over, 4 cents.

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline			Kero.
	Tank-wag. dlr.	Tank-car con'r.	Inc. tax	tank wag.
Atl'tic City, N. J.	13.4	11.4	4.0	8.0
Newark	13.4	11.4	4.0	8.0
Annapolis, Md.	14.85	13.35	5.0	9.5
Baltimore	14.25	12.75	5.0	9.0
Cumberland	16.65	14.15	5.0	10.0
Wash'g'n, D. C.	12.5	11.0	3.0	9.5
Danville, Va.	16.95	14.45	6.0	12.9
Norfolk	15.75	13.25	6.0	11.5
Petersburg	16.05	13.55	6.0	11.7
Richmond	16.05	13.55	6.0	11.7
Roanoke	17.25	14.75	6.0	12.9
Charles'n, W. V.	17.05	14.55	6.0	12.6
Parkersburg	15.35	13.85	6.0	11.2
Wheeling	16.25	14.85	6.0	12.2
Charlotte, N. C.	18.65	16.15	7.0	12.1
Hickory	19.15	16.65	7.0	12.5
Mt. Airy	18.95	16.45	7.0	12.3
Raleigh	18.25	15.75	7.0	11.6
Salisbury	18.75	16.25	7.0	12.2
Charleston, S. C.	17.25	14.75	7.0	10.6
Columbia	18.25	15.75	7.0	11.6
Spartanburg	18.95	16.45	7.0	12.4

Price basis to commercial consumers, effective March 8, 1937, in Maryland, District of Columbia, and in Arlington and Fairfax counties in Virginia; and March 12 in New Jersey: To contract accounts purchasing at least one full compartment at time by hose connection, on yearly purchases: From 2,500 to 100,000 gallons, consumer tank-wagon price at time and place of delivery; 100,000 gallons per year, consumer tankcar price plus .5 cent per gallon. Consumer tank-wagon price generally will be equivalent to dealer tank-wagon price less .5 cent per gallon.

Effective May 15, 1937, in North and South Carolina, West Virginia and Virginia (except Arlington and Fairfax counties): Commercial consumers taking deliveries of 50 gallons (W. Va., 100 gallons) or more at one time will be billed at posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gallons (W. Va., 100 gallons) will be billed at 4 cents per gallon over posted consumer tank-wagon price. Generally the posted consumer tank-wagon price will be the equivalent to the dealer price less .5 cent per gallon.

Discount for kerosene, 1 cent off tank-wagon price for 25 gallons or more under contract (contract not necessary in Baltimore) except no discount in New Jersey.

Southern District

STANDARD OIL CO. OF KENTUCKY

	Gasoline			Kero.
	Tank-wag.	Net dlr.	Inc. tax	tank-wag.
Atlanta, Ga.	19.0	16.0	7.0	12.0
Augusta	19.5	16.5	7.0	8.0
Macon	19.5	16.5	7.0	11.5
Savannah	19.0	16.0	7.0	10.0
Birm'ham, Ala.	21.5	18.5	8.0	12.0
Mobile	21.5	18.5	9.0	9.0
Montgomery	21.5	19.5	9.0	10.0
Jackson, Miss.	19.5	16.5	7.0	10.0
Vicksburg	20.0	17.0	7.0	9.5
Jacks'ville, Fla.	18.0	15.0	8.0	8.0
Miami	20.5	17.5	8.0	9.0
Pensacola	21.0	18.0	9.0	10.0
Tampa	18.0	15.0	8.0	8.5
Lexington, Ky.	19.5	16.5	6.0	10.0
Covington	18.0	15.0	6.0	10.5
Louisville	19.0	16.0	6.0	10.0
Paducah	16.5	13.5	6.0	10.0

*Includes 1-cent state tax.

Price basis to tank-wagon consumers: Effective January 4, 1937; 3 cents per gallon below tank-wagon price. Effective June 4, 1938, 2 cents per gallons discount eliminated from all kerosene markets in Mississippi, Alabama, Georgia, and Florida, markets being reduced correspondingly to a net basis.

Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax; and 1 cent per gallon on kerosene. Mobile, Ala., has a city gasoline tax of 2 cents per gallon; Birmingham, Ala., has a city gasoline tax of 1 cent per gallon; Pensacola, Fla., has a city gasoline tax of 1 cent.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline		Kero.
	Dealer	Inc. tax	tank-wag.
Denver, Colo.	15.5	5.0	11.5
Grand Junction	19.0	5.0	15.0
Pueblo	16.5	5.0	10.5
Casper, Wyo.	17.0	5.0	11.5
Cheyenne	13.0	5.0	13.0
Butte, Mont.	19.5	6.0	15.5
Billings	19.0	6.0	13.0
Helena	20.0	6.0	15.5
Great Falls	19.0	6.0	15.5
Salt Lake City, Utah	17.0	5.0	16.0
Twin Falls, Idaho	21.0	6.0	18.0
Boise	21.5	6.0	18.0
Albuquerque, N. M.	17.5	*6.5	12.0

*Includes city tax of .5 cent.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline			Kero.
	Tank-wag. con'r.	Di-vided dlr.	Inc. tax	tank-wag.
Ohio points	16.5	15.5	5.0	*13.0

*Includes state tax of 1 cent.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline			Kero
	T'wag. dealer	T'car consr.	Inc. tax	tank wag.
Albany	14.3	12.3	5.0	9.0
*Met. N. Y.:				
M'htt'n., Bronx	13.4	12.25	5.0	8.75
Staten Island	13.4	12.25	5.0	8.75
Q'ns. & Bklyn.	13.4	12.25	5.0	8.75
Buffalo	14.1	13.1	5.0	7.5
Rochester	15.0	13.2	5.0	8.5
Syracuse	14.0	12.9	5.0	9.0
Boston, Mass.	12.5	11.0	4.0	8.0
Portland, Me.	14.0	12.25	5.0	8.75
Manch'ter, N. H.	14.5	12.8	5.0	8.5
Burlington, Vt.	14.7	12.65	5.0	9.5

*Does not include 2 per cent city sales tax which is calculated on basis of net retail price exclusive of state and federal taxes. Metropolitan New York prices are undivided dealer prices; others are split dealer.

Price basis to undivided dealer: Posted dealer tank-wagon price less .5 cent. Price basis to commercial consumer: Effective Nov. 15, 1936, monthly purchases of 25,000 gallons and over, consumer tankcar prices at delivery point plus .5 cent per gallon; monthly purchases of 5,000 to 25,000 gallons, undivided dealer price at delivery point; monthly purchases under 5,000 gallons, pay divided dealer tank-wagon prices at delivery point.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

	Gasoline			Kero.
	Tank-wag.	Serv. sta.	Inc. tax.	tank-wag.
San Francisco	17.5	18.5	4.0	11.5
Los Angeles	17.0	18.0	4.0	10.0
Fresno, Calif.	18.5	19.5	4.0	12.5
Phoenix, Ariz.	21.5	22.5	6.0	*17.5
Reno, Nev.	20.5	21.5	5.0	13.5
Portland, Ore.	20.0	21.0	6.0	13.5
Seattle, Wash.	20.0	21.0	6.0	13.5
Spokane	23.0	24.0	6.0	16.5
Tacoma	20.0	21.0	6.0	13.5

*Includes 5-cent state tax.

Discounts to dealers: On gasoline, off tank-wagon price, to 100 per cent dealers, 3 cents; to split dealers, 2 cents. To commercial consumers: on tank-wagon price: on single deliveries of 40 gallons and over, advance quantity discount extended at time of delivery, 3 cents. Service station schedule applies on single deliveries less than 40 gallons. On kerosene in tankcar, transport truck and trailer delivery, 3 cents off tank-wagon price; plant deliveries to jobbers, 2.5 cents below tank-wagon.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline			Kero.
	Tank-wag.	Dlr.	Inc. tax	tank-wag.
Omaha	18.0	16.5	6.0	10.8
McCook	17.5	16.5	6.0	10.0
Norfolk	18.4	14.9	6.0	11.2
North Platte	18.4	15.4	6.0	11.0
Scotts Bluff	19.5	14.4	6.0	12.3

Discounts to commercial consumers for tank-wagon deliveries covered only by standard commercial consumers contract, effective Jan. 1, 1935

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline			Kero-
	Tank-wag. dlr.	Tank-car con'r.	Inc. tax	tank-wag.
N. Orleans, La.	19.75	17.25	*10.0	†13.5
Baton Rouge	17.75	15.25	8.0	*10.5
Alexandria	17.75	15.25	8.0	12.5
Lafayette	18.0	15.5	8.0	12.5
Lake Charles	17.75	15.25	8.0	12.5
Shreveport	16.5	14.0	8.0	11.0
Knoxville, Tenn.	21.0	18.5	8.0	14.5
Memphis	19.0	16.5	8.0	12.5
Chattanooga	20.5	18.0	8.0	14.0
Nashville	20.0	17.5	8.0	13.5
Bristol	19.0	18.5	8.0	14.5

*Includes 2-cent parish tax. †Includes 1-cent parish tax and 1-cent state tax.

Price basis to commercial consumers: Effective May 15, 1937, deliveries of 50 gallons or more in one delivery takes posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gallons at one time pay posted consumer tank-wagon price plus 4 cents per gallon. Generally, the posted consumer tank-wagon price will be equivalent to the dealer price less .5 cent per gallon. Kerosene prices include 1-cent state tax.

Pennsylvania, Delaware and Part of New England

ATLANTIC REFINING CO.

	Gasoline			Kero.
	Tank-wag. dlr.	Tank-car con'r.	Inc. tax	tank-wag.
Philadel'hia, Pa.	13.75	12.25	5.0	10.0
Pittsburgh	15.0	13.0	5.0	10.5
Allentown	14.25	12.75	5.0	10.5
Erie	14.5	13.0	5.0	10.0
Scranton	14.5	13.0	5.0	10.5
Altoona	15.0	13.0	5.0	10.5
Dover, Del.	13.5	....	5.0	10.5
Wilmington	12.5	....	5.0	9.75
Springf'ld, Mass.	13.5	....	4.0	8.0
Worcester	13.0	....	4.0	8.5
Hartford, Conn.	13.6	....	4.0	7.0
New Haven	13.5	....	4.0	7.0
Providence, R. I.	13.0	....	4.0	8.0

Price basis to undivided dealers, dealer tank-wagon price less .5 cent per gallon. Price basis to commercial consumers in Pennsylvania and Delaware, effective March 11, 1937: Consumers under contract using 100,000 gallons or more per year full compartment hose deliveries, tankcar plus .5 cent. Consumers under contract using less than 100,000 gallons per year compartment hose deliveries, undivided dealer price. Consumers under contract less than full compartment delivery, consumers not under contract, less than full compartment delivery, and consumers not under contract full compartment delivery, divided dealer price. Less than 25 gallons, tank-wagon delivery, 4 cents per gallon above undivided dealer price.

Oklahoma and Arkansas

CONTINENTAL OIL CO

	Gasoline		Kero.
	Dealer	Inc. tax	tank-wag.
Muskogee, Okla.	14.5	5.0	7.0
Oklahoma City	13.5	5.0	7.0
Tulsa	12.0	5.0	7.0
Ft. Smith, Ark.	14.75	5.0	7.5
Little Rock	17.25	7.5	8.0
Texarkana	14.0	5.0	8.0

Texas

	Gasoline			Kero
	Tank-wag.	Serv. sta.	Inc. tax.	tank-wag.
Dallas, Tex.	14.0	18.0	5.0	8.0
Fort Worth	14.0	18.0	5.0	8.0
Houston	14.5	19.0	5.0	8.0
San Antonio	13.5	17.5	5.0	8.0

Naphtha

STANDARD OIL CO. (INDIANA)

	Tank-wagon*
Oleum spirits	15.7
V.M.&P. naphtha	16.0
Cleaners' naphtha	15.0
Stanisol	15.0

*Prices include 3-cent Illinois tax, but not 1-cent federal tax or 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150-gallon lots if covered by contract.

Canada*

3-Star Imperial Gasoline
IMPERIAL OIL, LTD.

	Tank-wag.	Inc. tax	Kero. tank-wag.
Halifax, N. S.	24.5	10.0	18.5
St. John, N. B.	24.5	10.0	18.5
Montreal, Que.	21.0	6.0	17.5
Toronto, Ont.	22.0	6.0	17.0
Hamilton, Ont.	22.0	6.0	17.0
Winnipeg, Man.	27.5	7.0	20.7
Brandon, Man.	28.1	7.0	22.9
Regina, Sask.	26.0	7.0	22.0
Saskatoon, Sask.	28.3	7.0	24.9
Edmonton, Alta.	26.5	7.0	21.5
Calgary, Alta.	23.5	7.0	19.0
Vancouver, B. C.	23.0	7.0	23.0

*Imperial gallon used in Canada.

Divided dealers pay tank-wagon prices. Discount to undivided dealers, 1 cent below tank-wagon price. In maritime provinces both divided and undivided dealers pay tank-wagon price.

Tank-Wagon Changes

Standard Oil Co. (Indiana) September 12 reduced dealer gasoline in Grand Rapids .3 cent.

New York Market

(Continued from Page 279)

part of that state reported. Activity continued brisk in neutral oils. One or two refiners reported they faced a shortage of material for September delivery and were booking no new business. Spot sales of bright stock remained quiet but contract customers were ordering out material at approximately the same rate established during the last half of August and earlier this month. Prices on all grades of lubricants were unchanged. Other grades of cylinder oil were reported in somewhat better demand, but the improvement has been insufficient to move the price range.

Warwick Producer Finished

A new potential shallow oil pool is indicated by completion of a test by Bert Wilson of Sarnia on the Loftus McLean farm, Warwick Township, Lambton County, Ontario, 2 miles east of Watford and 4 miles north of the Brooke Township area where crude was encountered in several shallow wells four years ago. The Warwick well is reported producing 30 bbls. aday from the shallow crude horizon of the Onondaga limestone, around 400 to 500 feet. A second test will be drilled.

Prices of Refined Products

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of September 20, 1938

The following quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents a gallon on lubricating oils.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
62 oct. and below	.04¼	.04½
63-66 octane	.04½	.04⅝
67-69 octane	.04⅞	.05
70-72 octane (regular)	.05⅛	.05⅝
60-62 400 grades:		
62 oct. and below	.04¼	.04½
63-66 octane	.04½	.04⅝
67-69 octane	.04⅞	.05⅛
70-72 octane (regular)	.05⅛	.05⅝
64-66 375	.04⅝	.04¾
68-70 360	.04⅞	.05⅛

NORTH TEXAS—

U. S. Motor grades:		
62 octane and below	.04¼	.04½
63-66 octane	.04⅝	.04¾
67-69 octane	.04⅞	.05
70-72 octane (regular)	.05⅛	.05⅜
60-62 400	.04¼	.04½
64-66 375	.04⅝	.04⅞

NORTH LOUISIANA (Ark. and N. La. delivery)—

U. S. Motor grades:		
62 octane and below		.04¾
63-66 octane	.05	.05⅛
67-69 octane	.05⅛	.05¼
70-72 octane (regular)	.05½	.05⅝

ARKANSAS (Ark. and N. La. del.)—

U. S. Motor grades:		
62 octane and below		.04⅞
67-69 octane		.05½

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
62 octane and below	.04¼	.04½
63-66 octane	.04½	.04⅝
67-69 octane	.04⅞	.05⅛
70-72 octane	.05⅛	.05⅝
60-62 400 grades:		
62 octane and below	.04¼	.04½
63-66 octane	.04½	.04⅝
67-69 octane	.04⅞	.05⅛
70-72 octane	.05⅛	.05⅝
64-66 375	.04⅝	.04⅞
68-70 360	.05	.05¼

PENNSYLVANIA (inland refineries)—

58-60 U. S. Motor:		
Below 60 octane	.05	.05¼
65 octane	.06¾	.07
68-70 octane	.07	.07¼

CALIFORNIA (domestic movement)—

54-58 U. S. Motor	.06½	.08
58-60 400, 65 oct. and higher	.07½	.09

EAST COAST (domestic)—

U. S. Motor, 60-64.9 octane:		
New York (Bayonne)	.06	.06¼
Philadelphia	.06	.06¼
Boston	.06¼	.06½
Baltimore	.06	.06¼
Charleston, S. C.	.06¾	.07
U. S. Motor, 65 and above:		
*New York (Bayonne)	.06½	.06¾
Philadelphia	.06½	.06¾
Boston	.06½	.06¾
Baltimore	.06½	.06¾
Charleston, S. C.	.07	.07¼

*All grades of gasoline one-eighth to one-fourth cent less for barge shipments. New York Harbor prices are for New York and New England delivery. Prices for New Jersey delivery one-fourth cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
Below 60 octane		.04⅝
60-64.9		.04¾
65 octane and higher	.04⅞	.05½
68-70		.05¼

Naphtha

PENNSYLVANIA (inland refineries)—

52-56 450 (blending)	.04¾	.04⅞

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70	.03	.03¼
Grade 18-55	.03⅜	.03½

NORTH TEXAS—

Grade 26-70		.02⅜
Grade 18-55	.03⅛	.03¼

CALIFORNIA—

75-85 375-390	.06¼	.07

NORTH LOUISIANA (Ark. and N. La. delivery)—

Grade 26-70		.03¼

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 i.b.p., 110-flash, 540-550 e.p.	.03⅞	.04
41-43 gr., 300-320 i.b.p., 110-125 flash, 500-520 e.p.	.04⅛	.04¼
46-48 gr., 210-230 i.b.p., 480 max., e.p.	.04½	.04¾

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

41-43	.03⅞	.04⅛
42-44	.04⅛	.04⅜

NORTH TEXAS—

41-43	.03⅞	.04⅛

NORTH LOUISIANA (Ark. and N. La. delivery)—

41-43	.04⅛	.04⅜

ARKANSAS (Ark. and N. La. del.)—

41-43	.04½	.04⅝

PENNSYLVANIA (inland refineries)—

45	.04⅞	.05⅛
46	.05⅛	.05¼
47	.05¼	.05⅜

CHICAGO (Based on Group 3)—

41-43	.04	.04¼
42-44	.04¼	.04½

CALIFORNIA (Pac. Coast market)—

38-43 high burning test	.05	.06

NEW YORK (Bayonne, N. J.)—

41-43	.04⅝	.04¾

***GULF COAST (domestic)—**

41-43		.04

*Barge price one-eighth cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

Range oil	.03¾	.04
No. 1 prime white, 38-42	.03⅝	.03¾
No. 1 straw, 38-40	.03½	.03⅝
No. 2 straw, 32-36	.03½	.03¾
No. 2 dark, 32-36	.03⅝	.03½
No. 3 zero to 15, 28-32	.03¼	.03⅜
No. 3, 15 and above, 28-32	.02⅞	.03

NORTH TEXAS—

No. 1 prime white, 38-42	.03⅝	.03¾
No. 1 straw, 38-40	.03½	.03⅝

NORTH LOUISIANA (Ark. and N. La. delivery)—

No. 2, 32-36	.03¼	.03½

ARKANSAS (Ark. and N. La. del.)—

No. 2, 32-36		.03⅝

CHICAGO (Based on Group 3)—

Range oil	.03⅞	.04⅛
No. 1 prime white, 38-40	.03¾	.04
No. 1 straw, 38-40	.03⅝	.03⅞
No. 2 straw, 32-36	.03½	.03¾
No. 2 dark, 32-36	.03¾	.03½
No. 3, zero to 15,28-32	.03¼	.03⅜
No. 3, 15 and above, 28-32	.02⅞	.03

NEW YORK (Bayonne, N. J.)—

*No. 1	.04½	.04⅝
*No. 2		.04
*No. 4		.04

*Barge deliveries one-eighth to one-fourth cent under above tankcar price.

Gas Oil and Fuel Oil

(Gas oil per gal.; fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil	.02⅞	.03⅛
No. 4, low pourpoint, 24-28	1.00	1.10
No. 4, 15 and above, 24-28	.85	.90
No. 5, low pourpoint, 18-22	.70	.75
Below 18 fuel oil, industrial	.50	.60

NORTH TEXAS—

U.G.I. gas oil	.02⅞	.03⅛
No. 4, low pourpoint, 24-28	1.00	1.10
No. 5, low pourpoint, 18-22	.70	.75
Below 18 fuel oil, industrial	.50	.60

NORTH LOUISIANA (Ark. and N. La. delivery)—

10-14 fuel oil, industrial	.75	.82½

CHICAGO (Based on Group 3)—

U.G.I. gas oil	.02⅞	.03
No. 4, low pourpoint, 24-28	1.00	1.10
No. 4, 15 and above, 24-28	.85	.95
No. 5, low pourpoint, 18-22	.70	.80
No. 5, 15 and above, 18-22	.60	.70
No. 6, low pourpoint, 10-16	.60	.70
No. 6, 15 and above, 10-16	.35	.45

PENNSYLVANIA (inland refineries)—

36-40	.04	.04⅛

CALIFORNIA—

Los Angeles:		
30-40 gas oil, per bbl.	1.15	1.40
24 plus Diesel, per bbl.	1.05	1.40
24 plus Diesel (bunkers)	1.25	1.55
12-16 (bunkers at tidewater)	.80	.90
10-16 (cargo lots)	.65	.85
12-17 (tankcars)	.55	.90
10-17 (high sulfur)	.50	.85
San Joaquin Valley:		
10-18 (tankcars)	.60	.80
24 plus Diesel, per bbl.	1.20	1.50
San Francisco:		
24 plus Diesel, per bbl.	1.45	1.55
24 plus Diesel (bunkers)	1.50	1.55
10-16 (bunkers)	.90	.95

GULF COAST—

No. 2 fuel		.03½
43-47 Diesel		.03½
48-52 Diesel	.03½	.03¾
53-57 Diesel	.03⅝	.03¾
Bunkers (bulk cargoes)	.60	.65
Bunker C (bunkers)		.75

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil		.04¼
28-30 Diesel (lighterage 6¼c per bbl.)		1.75
28-30 Diesel (tankers)	.04¼	.04½
Bunker C (to ocean-going ships in N. Y. Harbor)		.95
Industrial fuel (tankcars)	.03¾	.04

Lighterage charge 5c bbl. additional.

Bright and Steam Refined

OKLAHOMA (Group 3)—

190-200 D, 15-25		.19
150-160 D, 0-10	.14¼	.16
150-160 D, 15-25	.13½	.15½
150-160 E, 15-25	.13	.15
100-110 D, 0-10		.14½
Steam refined:		
631 green (treated)		.12½
600 dark green (untreated)	.04½	.05

PENNSYLVANIA—

Bright stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pourpoint	.17	.17½
15 pourpoint	.16	.16½
20 pourpoint	.15	.15½
25 pourpoint	.14	.14½
Steam refined:		
600	.08	.08½
650	.10	.10½
600 Pennsylvania flash	.10½	.11
630 flash	.13½	.14
600 Warren E filtered	.12½	.13

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

150-3		.09
180-3		.10
180-4		.09½
200-3		.10½
200-4		.10
250-3		.11½
250-4		.11
280-3		.12½
280-4		.12
300-6½		.13
400-3½		.14
100-2½ paraffin oil		.06
15-20 pourpoint:		
200-3		.10
200-4		.09½
250-3		.11
250-4		.10½
280-3		.12
280-4		.12½

GULF COAST—

Pale oils:		
200-3	.07	.07¼
300-3	.07½	.07⅝
500-3½	.08⅛	.08⅝
750-3½	.08⅝	.09¼
1,200-3½	.09½	.09⅝
1,500-4	.09¾	.10
Red oils:		
200-5-6	.07¼	.07½
300-5-6	.07⅛	.07½
500-5-6	.08	.08½
750	.08¾	.09
1,200-5-6	.09¼	.09½

CALIFORNIA (moving to dom. market)—

Pale oils:		
100-2½-3	.07¼	.08
200-2½-3	.07¼	.08
300-2½-3	.07¼	.08
400-3-4	.07¼	.08
450-3-4	.07¼	.08
550-3-4	.09	.11
600-3-4	.09	.11
Red oils:		
200-4-5	.07¼	.08
300-5-6	.07¼	.08
350-5-6	.09¼	.11½
400-5-6	.09¼	.11½
450-5-6	.09¼	.11½
500-5-6	.09¼	.11½
600-5-6½	.09¼	.11½
700-6½ plus	.09¼	.11½
750-6½ plus	.09¼	.11½
900-6½ plus	.09¼	.11½

PENNSYLVANIA—

150 vis. at 70° color, 400-405 flash:		
Zero pourpoint	.17	.17½
10 pourpoint	.16	.16½
15 pourpoint	.15	.15½
25 pourpoint	.14	.14½
200 vis. at 70° F., 3 color:		
Zero pourpoint	.18	.18½
10 pourpoint	.17	.17½
15 pourpoint	.16	.16½
25 pourpoint	.15	.15½

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (a.m.p.) w.c. scale	.02¼	.02½

PENNSYLVANIA (inland refineries)—

122-124 (a.m.p.) w.c. scale	.0235	.0245
124-126 (a.m.p.) w.c. scale	.0235	.0245

NEW YORK—

Wax in bags fully refined:		
122-125 (a.m.p.) wax		.0420
125-127 (a.m.p.) wax		.0435
128-130 (a.m.p.) wax		.0445
130-132 (a.m.p.) wax		.0455
133-135 (a.m.p.) wax		.0500
135-137 (a.m.p.) wax		.0515
124-126 (a.m.p.) w.s.		.0185
124-126 (a.m.p.) y.s.		.0185
Petrolatum in barrels, carload lots:		
Dark green	.02	.02⅛
Amber	.02⅜	.02½
Extra amber	.02⅝	.02¾
Lily white	.05½	.05¾
Snow white	.06½	.06¾
Cream	.04½	.04¾

Export Prices

GASOLINE

GULF COAST—

U. S. Motor		.04⅝
60-62 400		.04⅞
61-63 390		.04¾
64-66 375	.04⅞	.05¼

LOS ANGELES—

U. S. Motor grades:		
55-65 octane		.05
65-69 octane		.05¼
Above 69 octane		.05½

KEROSENE

GULF COAST—

41-43 prime white		.04
41-43 water white		.04

LOS ANGELES—

41-43 water white	.05	.05¼

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.a.s. in bbls.)—

Cylinder stocks:		
600 Warren E	.15	.15½
600 S.R. unfiltered	.16	.16½
630 S.R. unfiltered	.17	.17½
600 flash, S.R.	.17	.17½
630 flash, S.R.	.20½	.21
Bright stocks:		
8 color	.16¼	.16½

NEUTRAL OIL

200-3 color	.21½	.22
150-3 color	.19½	.20

PARAFFIN WAX

NEW YORK (prices per pound)—

123-125 a.m.p.		.0375
125-127 a.m.p.		.0387
128-130 a.m.p.		.0412
133-135 a.m.p.		.0437
135-137 a.m.p.		.0455
Crude scale:		
124-126 w.s.	.0185	.0200
124-126 y.s.	.0185	.0200

Crude Oil Prices

Oklahoma, Kansas, North Central and East Central Texas

(Effective January 28, 1937)

East Texas (Aug. 29, 30 and Sept. 1, 1938)*	$1.25
Van, Tex.†	1.10
Camp Hill, Tex.	1.27
Cass County, Tex.‡	1.25
Talco	.73
Altus and Tipton, Okla.§	1.20
Other fields (see gravity table).	

*Price posted by all companies. †Humble Oil & Refining Co.; Pure Oil Co. ‡Texas Co. §Gulf Oil Co. Talco by Humble Oil & Refining Co.

North Louisiana and Arkansas

Smackover, all grades	$ .75
Tullos and Urania	1.02
El Dorado East field	.90
Union County, Ark.	.90
Ouachita County, Ark.	.90
Lisbon, La. (Sept. 19, 1938)*	.88

*Caddo Crude Oil Purchasing Co.

Rocky Mountain States

(Effective January 28, 1937)

Iles, Colo., light*	$1.18
Iles, Colo., heavy*	1.12
Greybull, Wyo.*	1.30
Torchlight, Wyo.*	1.30
Grass Creek, Wyo., light (July 8, 1938)*†	1.05
Grass Creek, Wyo., heavy (May 1, 1938)*	.50
Hamilton Dome, Wyo. (May 1, 1938)*	.45
Elk Basin, Wyo., light (July 8, 1938)*†	1.05
Frannie, Wyo., heavy*	.62
Frannie, Wyo., light (May 1, 1938)*	.65
Hogback, N. M. (Jan. 28, 1937)*	1.33
Salt Creek, Dutton Creek and Midway, Wyo., take Stanolind's Oklahoma prices on a gravity basis.	
Big Muddy, Wyo.†‡	1.23
Rock Creek, Wyo.†	1.20½
Lea County, N. M. (see West Texas gravity table).	
Artesia, N. M. (Jan. 2, 1937)‡	.90
Maljamar, N. M. (Jan. 28, 1937)‡	.90
Canon City and Florence, Colo.	1.10
Lance Creek, Wyo.*	.97
Lander, Wyo. (Jan. 1, 1938)§	.51¼
Sunburst, Mont. (Nov. 16, 1937)†	.90
Cat Creek, Mont. (Jan. 1, 1938)‡	1.30
Garland, Wyo. (Jan. 1, 1937)†	.50

*Stanolind Oil & Gas Co. and Ohio Oil Co. †Ohio Oil Co. ‡Continental Oil Co., Texas Co. (April 1, 1938. §Hudson Oil Co.

Gulf Coast

(Effective January 28, 1937)

Choctaw and Darrow, La. See note below	
Clay Creek, Tex.	$1.00
Garden Island, La.	1.37
Cleveland, Tex.	1.27
Hardin, Tex.	1.15
Lafitte, La.	1.24
Livingston, Tex.	1.27
Welsh, La.	.98
Tepetate (La.) (Jan. 28, 1937)	1.24

Duval, Jim Hogg, Webb and Zapata counties, Texas, and Heyser and Placedo fields take Mirando gravity prices. Jennings, La., 5 cents lower than Gulf Coast prices on each degree. Segno, Texas, takes Gulf Refining Co.'s Gulf Coast prices. Choctaw and Darrow, Louisiana, posted for first time by Standard Oil Co. of Louisiana, start below 21 degrees at 90 cents, with 3-cent differential up to 25 gravity, then 2-cent differential up to 40 and above, $1.36. Effective October 1, 1937, Stanolind Oil & Gas Co. in Evangeline, La., pays 92 cents for below 20 gravity, adding 2 cents for each degree upward to 40 and over, at $1.34.

Middle Western States

OHIO OIL CO.

(Effective January 28, 1937)

Lima	$1.00
Centralia, Ill. (Aug. 8, 1938)‡	1.10 to 1.25
Illinois	1.35
Princeton, Ind.	1.35
Midland, Mich. (Jan. 5, 1938)*	1.12
West Branch, Mich. (Aug. 9, 1938)†	.90
Buckeye (Jan. 8, 1938)	1.09¼
Arenac, Mich. (Dec. 29, 1937)†	.80
Freeman-Redding (Mich.)	1.09¼
Muskegon, Mich.	1.00
Eastern Kentucky:	
Big Sandy River (July 1, 1938)	1.32
Kentucky River (July 1, 1938)	1.40
Western Kentucky (June 22, 1938).	1.30

*Posted by Pure Oil Co. †McClanahan P. L. and Simrall. ‡Posted by Owensboro Oil Corp. (Standard of Ohio).

Midland, Mich., price posted by Simrall Corp. and Pure Oil Co. includes Greendale, Porter, Beaverton, Crystal and equal grades. West Branch and Arenac by Simrall Corp. Eastern Kentucky crude purchased by Ashland Refining Co., Ashland, Ky. Buckeye posted by Simrall Corp. and Pure Oil Co.

West Texas

See gravity table.

Pecos County*	$ .91
Pecos shallow†	.81

*Shell Petroleum Corp., Gulf Pipe Line Co. and Humble Oil & Refining Co. †Shell Petroleum Corp.

Eastern States

TIDE WATER ASSOCIATED OIL CO. and NEW YORK TRANSIT CO.

(Effective Sept. 1, 1938)

Bradford, Pa.	$1.68
Allegany, N. Y.	1.68

SOUTH PENN OIL CO.

(Effective Sept. 1, 1938)

Pennsylvania Grade Oil in National Transit Lines (Bradford field)	$1.68
Pennsylvania Grade Oil in Southwest Pennsylvania Lines	1.34
Pennsylvania Grade Oil in Eureka Pipe Line lines	1.28
Pennsylvania Grade Oil in Buckeye Pipe Line lines	1.18
Corning Grade Oil in Buckeye Pipe Line Co. line (Sept. 3, 1938)	1.07

PENNZOIL CO.

(Effective Sept. 1, 1938)

Pennsylvania Grade Oil in National Transit Lines:	
Group A	$1.61
Includes Cochran, Franklin, Hamilton and Doolittle district.	
Group B	1.60
Includes Tidioute district.	
Group C	1.59
Includes Turkey and Tidioute districts.	
Group D	1.58
Includes Bear Creek and Porkey districts.	
Group E	1.56
Includes Eldeneau, Bull Creek, Rough Run, Carbon, Dipner, Bredlin, McJunkin, Jameson, Kenerdell, Emlenton, Tiona, Lacey and Kinzua districts.	

Southwest Texas

(Effective January 28, 1937)

Pettus	$1.37
Salt Flat, Darst Creek, Hilbig, Carroll, Clark, Zoboroski	1.09
Lytton Springs	1.12
Luling	1.00

Saxet and Taft take same gravity table as Gulf Coast.

PURE OIL CO.

(Effective Sept. 1, 1938)

Cabin Creek, W. Va.	$1.39
Bradford Hollow, W. Va.	1.38
Kelly Creek, W. Va.	1.38

Crude Oil Price Changes

Led by Standard of Louisiana, the price of Smackover, Arkansas, crude was changed from 90 cents to 75 cents per barrel, a 15-cent difference. Standard of Louisiana said in its announcement that the price was an adjustment, and not a reduction. The new price was made effective on September 16.

Humble Oil & Refining Co. announced on September 19 that it had revoked its price changes made on August 29 for oil of over 40 gravity in certain Gulf Coast pools, and in West Central Texas and Panhandle fields, but will continue to pay its August 29 schedule of prices in Refugio field and the Mirando district which includes pools in Jim Hogg, Webb, Jim Wells and Zapata counties and the Heyser and Placedo pools. The prices in Refugio will continue to be $1.43 for 41-gravity oil with 2 cents added for each degree up to and including 50 and over at $1.61. In the Mirando district the price will continue at $1.38 for 41-gravity oil, with 2 cents added for each degree up to and including 50 gravity and above at $1.56. Failure of competitors to meet the increased prices caused a revocation of them in the several fields named by Humble.

Effective September 19, Caddo Crude Oil Purchasing Corp. announced the following Lisbon crude price schedule: Below 34 gravity, 88 cents, with a 2-cent differential to 35 and above at 92 cents.

Crude Prices by Gravities

	Oklahoma-Kansas	Oklahoma-Kansas	North and Central Texas	East Central Texas (Mexia district)	North Louisiana-Arkansas	Gray County, Texas	Hutchinson-Carson counties, Texas	Rodessa, Louisiana-Texas and Panola County, Texas	Conroe, Tomball, Raccoon Bend, (Deep) Satsuma	Gulf Coast	Gulf Coast	Lea County, N. Mex. West Texas except Pecos County	Mirando district, Texas	Marion County, Texas	Refugio, Greta, Saxet, Taft, Texas	Anahuac, Flour Bluff, Dickson, Turtle Bay	White Castle, Louisiana	Iowa, Louisiana	Cayuga, Texas
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Bel. 18	....	....	....	....	....	....	....	....	....	$.95	....	....	....	....	....	....	....	$.90	....
18-18.9	....	....	....	....	....	....	....	....	....	.95	....	....	....	....	....	....	....	.92	....
19-19.9	....	....	....	....	....	....	....	....	....	.95	....	....	....	....	....	....	$.94	.94	....
20-20.9	....	....	....	....	....	....	....	....	....	.95	$.95	....	$.96	....	$1.01	....	.96	.96	....
21-21.9	....	....	....	....	....	....	....	....	....	.98	.98	....	.98	....	1.03	....	.98	.98	....
22-22.9	....	....	....	....	....	....	....	....	....	1.01	1.01	....	1.00	....	1.05	....	1.01	1.01	....
23-23.9	....	....	....	....	....	....	....	....	....	1.04	1.04	....	1.02	....	1.07	....	1.04	1.04	....
24-24.9	....	....	....	....	....	....	....	....	....	1.07	1.07	....	1.04	....	1.09	....	1.07	1.07	....
Bel. 25	....	$.98	....	....	$.90	....	....	$.93	....	....	....	....	....	$.90	....	....	....	....	$.88
25-25.9	....	1.00	....	....	.92	....	....	.95	....	1.10	1.10	$.78	1.06	.92	1.11	....	1.10	1.10	.90
26-26.9	....	1.02	....	....	.94	....	....	.97	....	1.13	1.13	.80	1.08	.94	1.13	....	1.13	1.13	.92
27-27.9	....	1.04	....	....	.96	....	....	.99	....	1.15	1.15	.82	1.10	.96	1.15	....	1.15	1.15	.94
28-28.9	....	1.06	....	....	.98	....	....	1.01	....	1.17	1.17	.84	1.12	.98	1.17	....	1.17	1.17	.96
Bel.29	$1.06	....	$.96	$1.03	....	....	....	....	$1.20	....	....	....	....	....	....	....	....	....	....
29-29.9	1.08	1.08	.98	1.05	1.00	....	....	1.03	1.22	1.19	1.19	.86	1.14	1.00	1.19	....	1.19	1.19	.98
30-30.9	1.10	1.10	1.00	1.07	1.02	....	....	1.05	1.24	1.21	1.21	.88	1.16	1.02	1.21	$1.16	1.21	1.21	1.00
31-31.9	1.12	1.12	1.02	1.09	1.04	....	....	1.07	1.26	1.23	1.23	.90	1.18	1.04	1.23	1.18	1.23	1.23	1.02
32-32.9	1.14	1.14	1.04	1.11	1.06	....	....	1.09	1.28	1.25	1.25	.92	1.20	1.06	1.25	1.20	1.25	1.25	1.04
33-33.9	1.16	1.16	1.06	1.13	1.08	....	....	1.11	1.30	1.27	1.27	.94	1.22	1.08	1.27	1.22	1.27	1.27	1.06
34-34.9	1.18	1.18	1.08	1.15	1.10	....	....	1.13	1.32	1.29	1.29	.96	1.24	1.10	1.29	1.24	1.29	1.29	1.08
Bel. 35	....	....	....	....	....	0.96	$.91	....	....	....	....	....	....	....	....	....	....	....	....
35-35.9	1.20	1.20	1.10	1.17	1.12	.98	.93	1.15	1.34	....	1.31	.98	1.26	1.12	1.31	1.26	1.29	1.29	....
36-36.9	1.22	1.22	1.12	1.19	1.14	1.00	.95	1.17	1.36	....	1.33	1.00	1.28	1.14	1.33	1.28	1.29	1.29	....
37-37.9	1.24	1.24	1.14	1.21	1.16	1.02	.97	1.19	1.38	....	1.35	1.02	1.30	1.16	1.35	1.30	1.29	1.29	....
38-38.9	1.26	1.26	1.16	1.23	1.18	1.04	.99	1.21	1.40	....	1.37	1.04	1.32	1.18	1.37	1.32	1.29	1.29	....
39-39.9	1.28	1.28	1.18	1.25	1.20	1.06	1.01	1.23	1.42	....	1.39	1.06	1.34	1.20	1.39	1.34	1.29	1.29	....
40,over	1.30	1.30	1.20	1.27	1.22	1.08	1.03	1.25	1.44	....	1.41	1.08	1.36	1.22	1.41	1.36	1.29	1.29	....

Effective July 8, 1938, Standard Oil Co. of Louisiana posted prices in Buckner, Magnolia, and Village pools in Columbia County, Arkansas, as follows: Below 25 degrees 83 cents; 25-25.9 degrees 85 cents; with 2 cents added for each degree upward to and including 40 degrees and above at $1.15.

Column 1—Companies posting are Barnsdall, Bell, Champlin, Continental, Cushing, Derby, Bay, Eason, El Dorado, Cities Service, Falcon, Globe, Gulf, Johnson, National, Phillips, White Eagle, Stanolind, Sunray, Texas, Sun, Vickers and Wilcox.

Column 2—Anderson & Prichard, Carter, Cosco, Deep Rock Magnolia, Mid-Continent, Pure, Rock Island, Shell, Sinclair, Skelly and Tide Water.

Column 3—All purchasers.

Column 4—Humble Oil & Refining Co. and Sinclair Oil Purchasing Co.

Columns 5, 6, 7 and 8—All companies. Effective July 8, by Standard Oil Co. of Louisiana, Buckner, Magnolia and Village, Arkansas, 7 cents per barrel less than prices in Column 5.

Column 9—Humble Oil & Refining Co. and Sun Oil Co. Tide Water Oil Co.'s schedule starts at 35 degrees, $1.34 with 2-cent spread up to 40 and over at $1.44. (Raccoon Bend prices are for deep sand oil.)

Column 10—The Texas Co. (Gulf Refining Co. pays same prices up to and including 34 gravity, but continues its 2-cent spread up to 40 and over at $1.41).

Column 11—Humble Oil & Refining Co., Sinclair Prairie Oil Marketing Co., Sun Oil Co. Column 12—Texas Co. and Sinclair Prairie Oil Marketing Co. schedules stop at 36 and above, $1. Column 13—All purchasers (effective July 6, 1937). Column 14—Magnolia Petroleum Co. Column 15—Humble Oil & Refining Co. (effective July 6, 1937.) Column 16—Humble Oil & Refining Co. Columns 17 and 18—Shell Petroleum Corp. Column 19—Tide Water Oil Co.

Rocky Mountain Runs

Production estimates for the week ended September 17 follow:

	Bbls.
WYOMING	
Salt Creek	15,700
Big Muddy	1,180
Garland	2,540
Grass Creek	1,910
Hamilton dome	1,550
Lance Creek	15,230
Lost Soldier	1,510
Medicine Bow	3,180
Oregon Basin	4,000
Rock River	1,810
Miscellaneous	6,500
Total Wyoming	55,110
MONTANA	
Cut Bank	7,560
Kevin-Sunburst	3,650
Miscellaneous	1,300
Total Montana	12,510
COLORADO	
Iles dome	1,910
Miscellaneous	1,600
Total Colorado	3,510
NEW MEXICO	
Cooper	4,960
Eaves	940
Eunice	25,470
Hardy	2,500
Hobbs	15,390
Jal	1,040
Langlie	4,280
Lynch	580
Lynn	870
Mattix	3,200
Monument	26,430
North Lynch	40
Penrose	5,590
Rhoades	180
Skelly	1,920
South Eunice	3,040
Vacuum	3,700
Artesia-Maljamar	4,520
Getty	300
Hogback	200
Rattlesnake	680
Table Mesa	100
Total New Mexico	105,930
Total Rocky Mountain region	177,060

Market Record of Active Oil Stocks

Compiled by Carl H. Pforzheimer & Co., 25 Broad Street, New York City, Member New York Stock Exchange and New York Curb Exchange

New York Stock Exchange

1938 High	1938 Low	Week ending Sept. 17 Sales	High	Low	Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1937	1937 High	1937 Low	1936 High	1936 Low
78	55	1,300	67¾	65	66	Amerada Corp.	788,675	N.P.	50cQ	7-30-38	$2.00	114⅞	51½	125½	75
27⅜	17¾	7,200	22½	20⅛	20⅛	Atlantic Refining	2,663,999	$25	25cQ	9-15-38	1.00	37	18	35⅛	26⅝
23⅜	12⅛	22,000	20¼	15⅝	16½	Barber Asphalt Co.	390,223	$10	75c	12-16-37	1.00	43⅜	10⅛	38½	21
21⅜	10⅛	23,700	17½	14⅛	14⅞	Barnsdall Oil Co.	2,250,344	$5	25cQ	8-1-38	1.00	35¼	10	28¼	14⅛
10¾	7	34,500	9	7⅞	8⅛	Consolidated Oil Corp.	13,915,167	N.P.	20cQ	11-15-38	.90	17⅝	7	17⅛	11⅛
35¾	21¼	9,400	29⅝	26	27⅝	Continental Oil of Delaware	4,682,583	$5	25cQ	9-30-38	1.50	49	24	44⅞	28⅛
9¾	5	16,000	7½	5⅞	6¼	Houston Oil (new)	1,098,618	$25	...	10-17-30	....	17⅝	4¾	13⅜	6⅝
22⅝	12¼	4,500	17	15	15	Mid-Continent Petroleum	1,857,912	$10	25c	6-1-38	1.50	35⅝	14	30⅞	17¼
17¾	10⅝	800	14¾	12	12	Mission Corporation	1,382,945	$10	$1	6-29-38	1.25	34	15	29⅞	16⅝
23	13	11,000	17½	13	13¼	National Supply	1,155,170	$10	$2 pf.‡	12-22-37	(‡)	41⅝	17⅝	75½	19⅞
14⅞	8⅞	25,700	10	8⅜	9½	Ohio Oil Co.	6,563,377	N.P.	50c	12-15-37	1.00	22⅞	8	18	12⅛
15⅞	10¼	600	10½	10⅜	10½	Pacific Western Oil	1,000,000	N.P.	75c	12-15-37	.75	29⅜	11⅜	23½	11⅜
9¼	7	No sales	..	..	..	Pan American Pet. & Trans.	4,702,945	$5	$1 •	12-21-37	1.00	17⅛	7	20⅝	12¼
44⅜	27¼	14,000	39¾	35¼	35¼	Phillips Petroleum	4,449,052	N.P.	50cQ	9-1-38	2.75	64	30⅛	52⅜	33⅛
25⅜	15	4,500	22⅜	20	20¼	Plymouth Oil Co.	1,029,800	$5	35cQ	6-30-38	1.65	29⅞	13	27⅜	11⅞
13½	8¼	30,700	10⅛	8½	8¾	Pure Oil Co.	3,285,120	N.P.	25c	12-1-37	.25	24⅜	8⅜	27⅞	16
8⅞	5	20,500	7½	6¼	6⅛	Richfield Oil Corp.	3,896,638	N.P.	25c	12-24-37	.25	6⅛	4⅛	..	..
27½	15½	5,300	20½	18	18⅛	Seaboard Oil of Delaware	1,244,383	N.P.	25cQ	9-15-38	1.00	54⅛	16	44	30½
18⅜	10	6,900	15⅜	12½	14¼	Shell Union Oil	13,070,625	N.P.	35c	7-15-38	1.00	34⅜	14⅞	28⅛	14⅜
34¾	18½	4,400	23½	19½	22	Skelly Oil	1,003,949	$15	50c	6-25-38	1.50	60⅜	26½	47⅜	19½
16⅜	10¾	38,300	13⅜	11⅞	12⅝	Socony-Vacuum	31,151,071	$15	25c	9-15-38	.80	23¼	13	17½	12⅛
34⅞	25⅛	15,200	30¼	27⅞	27⅞	Standard Oil of California	13,014,754	N.P.	35cQ†	9-15-38	2.00	50	27⅛	47⅝	35
35½	24¾	14,900	29½	27	27⅝	Standard Oil (Indiana)	15,267,030	$25	25cQ	9-15-38	2.30	50	26⅛	48½	32⅜
42	32½	300	42	41	42	Standard Oil of Kansas	112,837	$10	$5	12-20-37	5.00	43	30⅝	31	25
58⅜	39¾	27,900	53¼	50	50½	Standard Oil of New Jersey	26,224,767	$25	$1SA†	6-15-38	2.50	76	42	70⅜	51⅛
59	45	800	52	50	50	Sun Oil	2,316,484	N.P.	25cQ	9-15-38	$1 & 8% Stk.	77½	44½	91	70
4¼	1¾	16,400	3⅛	2½	2½	Superior Oil Corp.	1,388,079	$1		...	....	7¾	1½	6⅜	3
49⅝	32⅝	30,400	43¾	39⅝	40¾	Texas Corp.	10,875,006	$25	50cQ	10-1-38	2.25	65⅛	34⅜	55¼	28⅜
5¼	2⅝	7,600	4½	3½	3½	Texas Gulf Producing Co.	888,138	N.P.	10c	12-23-37	.10	9⅜	2	8⅞	4⅜
12½	7	7,100	10⅜	9	9	Texas Pacific Coal & Oil	388,237	$10	10c	9-1-38	.40	16⅝	5⅜	15¼	7⅛
15⅜	10⅛	9,800	12⅜	11⅛	12	Tide Water Associated	6,369,175	$10	25cQ	9-1-38	1.20	21⅝	13⅛	21¾	14⅜
22½	17⅛	2,800	20¼	19¼	19½	Union Oil of California	4,666,270	$25	30cQ	8-10-38	1.40	28¼	17½	28½	20⅝
23½	20	700	20	20	20	Union Tank Car Co.	1,200,000	N.P.	30cQ	9-1-38	1.60	31½	22	31⅝	22⅝
3½	1⅝	2,000	2⅝	2⅜	2⅜	Wilcox Oil & Gas	506,522	$5		5-10-28	....	6¼	1⅜	5¼	2⅜

*Payable in 3½% notes. †Includes extras. ‡One-tenth share $2 preferred stock

New York Curb Exchange

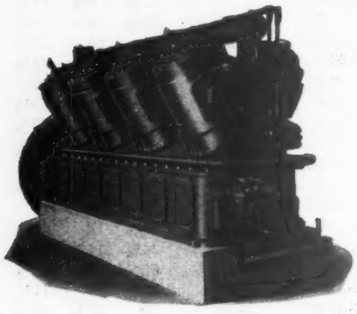
1938 High	1938 Low	Week ending Sept. 17 Sales	High	Low	Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1937	1937 High	1937 Low	1936 High	1936 Low
11¾	5	6,600	9¼	8	8¼	American Republics Corp.	1,308,049	$10	10c	7-11-38	$0.40	10	6⅝	..	..
10¼	5	3,000	6⅞	5	5	Bridgeport Machine Co.	260,000	N.P.	1.25	12-30-37	$2.00	21⅜	7	21	13¼
39	26	150	26½	26	26	Buckeye Pipe Line Co.	200,000	$50	25c	9-15-38	3.75	51½	36	50	39⅝
113¾	97	No sales	..	..	..	Chesebrough Mfg. Co.	120,000	$25	$1.50Q†	9-27-38	7.00	123	95½	124¾	105
11	5⅛	4,300	7⅛	5⅛	6⅛	Cities Service (new)	3,714,317	$10	....	6-1-32	....	5⅝	1½	7⅝	3
2⅜	⅞	5,300	1¼	1	1	Cosden Petroleum	462,551	$1	....	.....	....	5½	1½	4½	1½
27½	17½	5,200	20⅛	18¾	19⅛	Creole Petroleum	6,975,383	$5	50cSA†	6 10-38	1.00	38¾	20¼	39	19⅝
10¼	5½	800	8⅛	7⅝	7⅝	Darby Petroleum	351,390	$5	25cSA	7-15-38	.50	18⅝	6½	18⅛	9
3½	1⅞	100	2	2	2	Derby Oil & Refining	263.162	N.P.	....	...	....	8⅜	2¼	6¾	1⅞
31	19½	250	20½	19½	19½	Eureka Pipe Line	50,000	$50	50c	8-1-38	4.00	47½	24½	47½	38½
46⅞	33	5,400	40	36½	37⅞	Gulf Oil Corp.	9,076,202	$25	25cQ	10-1-38	1.00	63⅛	33	59	36
72⅝	56	3,300	66	62½	63⅛	Humble Oil & Refining	8,987,840	N.P.	62½c	10-1-38	2.00	87	54⅞	80	57
19½	15	3,100	16⅝	15⅛	15⅛	Imperial Oil of Canada	26,965,078	N.P.	62½cSA†‡	6-1-38	1.25	24¼	14½	24½	19⅜
9⅜	6⅝	100	7⅜	7⅜	7⅜	Indiana Pipe Line	300,000	$10	30c	5-14-38	.80	15	5⅜	9⅜	5½
31¼	23	5,900	25¾	23	23	International Petroleum	14,324,088	N.P.	$1.25†‡	6-1-38	2.50	39½	23½	39⅝	32⅝
5	3	100	3⅜	3⅜	3⅜	Kirby Petroleum Co.	500,000	$1	10c	4-15-38	....	8⅜	2⅜	5⅜	2⅜
25⅛	15⅝	5,000	22	19	19⅞	Lion Oil Refining	434,820	N.P.	25cQ	10-10-38	1.50	34	12½	17¾	7⅜
10¼	6⅝	5,000	9	8½	8¾	Lone Star Gas	5,533,747	N.P.	20c	8-20-38	.80	14¼	5¼	14¼	9⅜
9⅜	6½	8,700	7¾	7	7	Louisiana Land & Exp.	2,977,449	N.P.	10cQ	9-15-38	.50	15¼	6⅜	15⅜	9⅜
9¼	6⅜	1,000	8⅜	7⅜	8	Midwest Oil Co.	998,444	$10	50c	6-15-38	1.00	14⅜	6¼	..	..
5⅜	4½	1,500	5¼	5	5⅛	Mountain Producers	1,593,584	$10	30cSA	6-15-38	.60	7⅞	4⅛	8⅜	5
14⅝	11½	2,300	12	11½	11¾	National Fuel Gas	3,810,183	N.P.	25cQ	10-15-38	1.00	19½	12	23	17⅜
9¼	7	800	7	7	7	National Transit	509,000	$12.50	35cSA	6-15-38	1.00	12½	7¼	15⅜	9¼
2⅝	1½	2,800	1⅝	1½	1⅝	New Mexico and Arisona	1,000,000	$1	1c	12-1-36	....	5	1⅛	6⅜	1⅝
4½	4	100	4	4	4	New York Transit	100.000	$5	15c	4-15-38	1.00	5⅜	3⅞	6¼	4¼
6	4	100	5	5	5	Northern Pipe Line	120,000	$10	20c	6-1-38	1.00	12⅜	5⅜	9⅜	4⅞
7⅝	3¾	16,900	4⅜	3¾	3⅞	Pantepec Oil	2,441,142	$1	....	.....	....	9⅝	2⅜	10⅛	3¼
3½	1⅝	1,000	2¼	2	2	Root Petroleum Co.	336,045	$1	25c	2-1-37	.25	13⅜	2	19¼	4½
4	2⅛	500	2¾	2⅝	2⅝	Ryan Consolidated	296,931	N.P.	....	.....	....	6½	2¼	4⅜	1⅜
5⅜	3⅜	200	3⅝	3⅝	3⅝	Southern Pipe Line	100,000	$10	15cSA	9-1-38	.45	7¼	3⅞	7⅞	3¼
39	28¾	300	33	31⅛	31⅛	South Penn Oil	1,000,000	$25	37½cQ	9-30-38	3.65	56	35	44	32½
22¼	19	200	19¾	19½	19½	Southwest Penna. Pipe Lines	35,000	$50	50cQ	7-1-38	2.00	42	20	60	44
18¾	15	1,800	17⅞	17¼	17¼	Standard Oil of Kentucky	2,604,790	$10	25c	9-13-38	1.50	21⅛	14⅜	23⅜	17⅛
8⅜	6½	No sales	..	..	..	Standard Oil of Nebraska	166,403	$25	25c	3-29-37	.25	13⅜	8	14⅜	11
22¾	16¼	1,600	20½	19½	19½	Standard Oil of Ohio	753,740	$25	25c	9-15-38	1.50	45	16	40	21⅜
3¼	2⅛	2,500	2⅝	2½	2½	Sunray Oil	2,006,176	$1	10c	12-24-37	.25	4⅜	2	5	2⅜
5	3½	200	4⅜	4¼	4⅜	Texon Oil & Land	936,024	$2	15cQ	9-30-38	.45	7⅝	2	9⅜	5⅝
7⅝	4¼	700	5½	5½	5½	Transwestern Oil Co.	750.000	$10		.....	.....	13⅜	4⅝	..	..
5¼	2¾	19,900	3⅝	2⅞	3	United Gas Corp.	7,818,959	$1	....	.....	....	13⅜	3	10⅜	4

†Includes extras. ‡Payable in Canadian funds. §Of which $1 was in preferred stock.

New or Improved Equipment

I-R Engine Is Designed for Use Wherever Gas Is Available

The Ingersoll-Rand Type PVG gas engine, recently announced, is designed for use wherever gas is available as a fuel. It is a logical development to supplement the XVG gas-engine-driven engine, built for continuous full-load operation



compressor introduced by this company in 1932. The PVG is a four-cycle, V-type, multicylinder at the moderate speed of 400 r.p.m. Available in three sizes of four-cylinder 185-horsepower, six-cylinder 275-horsepower and eight-cylinder 370-horsepower, it has the same cylinder arrangement and cylinders as the XVG, and it is manufactured in the same plant with the same jigs and tools.

The PVG engine provides economical power for driving centrifugal pumps, blowers, and generators, as well as existing line shafting or machinery. Copies of Bulletin 10011 may be obtained from Ingersoll-Rand Co., 11 Broadway, New York, or any branch office.

Here and There With Men Who Manufacture Equipment

The San Francisco district offices of Monsanto Chemical Co., St. Louis, Mo., have been moved to 100 Bush Street. Edward Schuler is manager.

Kibele Manufacturing Co. of Dallas, Tex., has appointed Lucey Export Corp. of 3505 Woolworth Building, New York, its exclusive export distributor for the complete line of Kibele oil-field products. Chief among these are the tubing-catcher, swab, valve-in-head packer and boiler-feed pump pistons.

Edward B. Tracy, assistant sales manager of the American Brass Co., of Waterbury, Conn., has just made a trip through the oil fields in Texas and the Gulf Coast, returning through Oklahoma on his way to the home office.

The Air-Maze Corp. announces removal to its new location at 5200 Harvard Avenue, Cleveland, Ohio, where greater space and increased manufacturing facilities in a modern factory will further its policy of giving quick and efficient service.

Collector Carries Off Gas and Heat Caused by Arc Welding

The Ruemelin Manufacturing Co., 3860 North Palmer Street, Milwaukee, Wis., announces a new fume collector designed to remove the irritating gases, smoke and heat caused by arc welding. Such modern ventilation by means of local exhaust hoods has proven practical in service, as it collects the fumes at the source of generation, instead of exhausting the entire shop atmosphere. Such fumes are exhausted outdoors as no filtering unit is known to eliminate dangerous gases.

The Ruemelin fume collector covers a 9-foot semicircle. There is also available a hinge-type collector affording a reach of 16 feet from the building wall so that practically every welding operation can now be provided with adequate ventilation.

The inlet snout is automatically supported in any required working position and can be adjusted instantly to a new position without loss of time. Collecting fumes at the source is efficient, consuming less power. The use of this device increases the operator's comfort and efficiency in production. There are more than 1,000 Ruemelin collectors in use for the collection of dust and fumes. The company sends a bulletin upon request.

BRIDGEPORT ELECTS THREE MEN TO EXECUTIVE POSTS

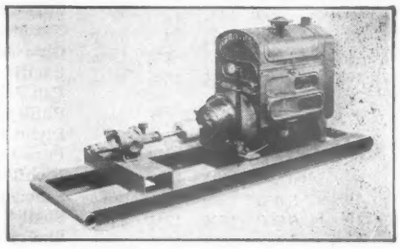
Bridgeport Machine Co., of Wichita, Kans., announces the advancement to executive positions of three of its men. All three have a wide acquaintance among drilling contractors and producers through their many years of activity in oil-field supply circles in the territories where the company has operated for over 30 years.

B. B. Root, who for years has been in charge of the company's legal department, was elected at a recent board meeting to the position of vice president and general manager. L. A. Babb, general sales manager, who has been with the company over 20 years, was advanced to vice president and general sales manager. F. K. Blauvelt, plant superintendent for the past 10 years, in charge of the company's manufacturing and engineering departments, was advanced to vice president and plant superintendent. A. A. Buschow, president-treasurer and chairman of the board, will continue active in the company's management, according to the announcement which has been released by the Bridgeport Bulletin, semimonthly publication of the Bridgeport Machine Co.

B. B. ROOT *L. A. BABB* *F. K. BLAUVELT*

Addition to Its Line of Pumps Is Announced by Warner Lewis

An addition to its line of pumping units is announced by Warner Lewis Co., 230 East Third Street, Tulsa. The Viking rotary pump, Model L-120, is rated at 90 g.p.m. at 400 r.p.m. It is built for severe use, such as it is likely to encounter in the oil field. It has an extra-long stuffing-box and



rotor locked with thrust bearing to prevent excessive wear and end play. The standard unit is iron-fitted, but it is available also bronze-fitted or all bronze. It is provided with a sturdy base, electric-welded and designed to eliminate unnecessary weight. Power is a Briggs & Stratton, 4-horsepower air-cooled gas engine, complete with 6:1 built-in reduction. All exposed gearing or belt drives have been eliminated in order to reduce size of the unit, its weight and hazards. The complete unit weighs only 310 pounds.

Applications of this new pump include pumping crude oil, fuel oil, gasoline, road oil, water, tank-bottoms, etc.

Additional models in all sizes from one-half to 1,000 g.p.m., equipped with either rotary or centrifugal pumps and powered with any engine specified, are available. The Warner Lewis Co. carries a large stock of oil industry equipment, which includes Brodie petroleum meters, Kunkle valves, Monat packless valves, Morrison Brothers brass goods, Briggs & Stratton engines, Viking pumps and repair parts.

Okmulgee Opens New Office

Okmulgee Supply Corp., Okmulgee, Okla., has a new branch office in Fort Worth, Tex., for customers in North Texas, northwestern Louisiana, southwestern Arkansas, and New Mexico. J. D. Roberts, secretary of the company for the past nine years, has been transferred from Okmulgee as district manager of the new Fort Worth office, located in the Petroleum Building. The company is distributor for several large manufacturers of tubular goods, pumping equipment, wire line, industrial paints and pipe line coatings, electric motors, gas engines, and it deals in used and reconditioned oil-field equipment.

Standard Quill Bearing Developed

A heavy-duty needle roller bearing, the Standard Quill bearing, has been announced by the Bantam Bearings Corp., South Bend, Ind. This bearing is the result of many years' experience in the manufacture of needle rollers for use in automotive transmission, universal joints, Diesel engine wrist-pins and many types of heavy-duty machinery.

The ordinary assembly of outer race with hardened retaining rings, washers, stampings, etc., has been supplanted by a one-piece, rigid, channel-shaped outer race in which a full complement of

small-diameter rollers is firmly held. A spring steel band is employed to maintain the rollers and outer race as a unit during assembly, but is not called upon to carry any load while operating.

The rigid rib surfaces of the outer race are accurately hardened and ground, keeping the rollers in alignment. The rollers are correctly proportioned to the pitch diameter involved and are made with husky curvilinear trunnions. The load capacity is high. Space required is at a minimum.

Bulletins, Booklets and Other Literature for the Trade

The "Drillers' Wire Rope Handbook," announced by Broderick & Bascom Rope Co., 4203 North Union Boulevard, St. Louis, Mo., covers about everything in wire rope used in the oil industry, including jerk-lines, core-barrel lines, and miscellaneous ropes around the well, besides Yellow Strand rotary drilling cable and Broderick & Bascom cable-tool lines. The booklet was edited by Donald E. Dickey, the company's research engineer.

An eight-page illustrated catalog covering Vibro-Insulator rubber-to-metal type mountings has been released by the B. F. Goodrich Co., Akron, Ohio. This catalog is designed to serve as a practical guide in the selection and installation of such mountings.

A new bulletin, "Infilco Hot-Flow Water Softeners for Boiler Feed Water Treatment," has been issued by the International Filter Co., 59 East Van Buren Street, Chicago.

Republic Steel Corp., Cleveland, Ohio, offers an eight-page folder entitled "Enduro Stainless and Heat-Resisting Steels and Other Republic Products for the Process Industries."

Lee B. Mettler Co., 406 South Main Street, Los Angeles, Calif., is offering a bulletin on "Fan-Air," an automatic entrained-combustion motorized-fan gas-burner assembly.

Lane-Wells Officials Named

Rodney S. Durkee, whose election as executive vice president of Lane-Wells Co., is announced by Walter T. Wells, president, has been for years an

RODNEY S. DURKEE *M. E. MONTROSE*

important figure in the oil industry. He served as vice president and director of the Standard Oil Co. of New York and as director and treasurer of the General Petroleum Corp. He resigned as comptroller of the Socony-Vacuum Oil Co., Inc., New York, to take up his new duties at the Lane-Wells general offices in Los Angeles about November 1.

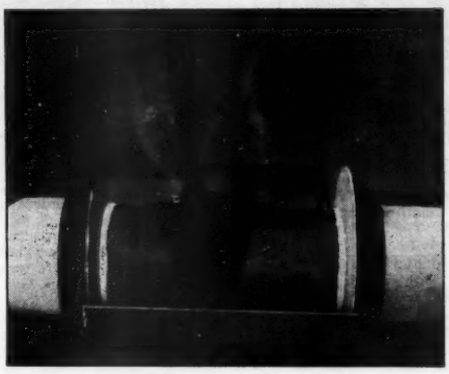
M. E. Montrose, elected to the board of directors, has been in charge of all Lane-Wells operations in the Gulf Coast for the past six years.

Naming of the two men to these new posts in the company is part of an expansion program upon which Lane-Wells has launched, Mr. Wells says.

"SOMASTIC" RESISTS ATTACKS ON LIFE OF PIPE LINE

Asphalt-mastic coating, as made and applied by Industrial Engineering Co., San Francisco, under the registered trade-mark "Somastic," consists of graded sands, asbestos fiber, and limestone dust, all combined with the highest possible quantity of air-refined asphalt. By thorough mixing each particle of the inert aggregate is completely surrounded with asphalt.

Before this mixture is applied the pipe is shot-blasted to remove all mill scale, rust, mill coatings



Pouring hot Somastic pipe coating into mold

and other foreign matter. The clean pipe then is heated, spray-coated with a primer, and covered under pressure with a seamless uniform coating of the mastic at a temperature of approximately 350°. The thickness of the coat varies from five-sixteenths to five-eights of an inch, depending on the pipe diameter. Joints which are to be stockpiled before use are sprayed with whitewash after they have cooled to minimize the absorption of solar heat by the black mastic.

The graded sand and limestone dust, which make up 85 to 88 per cent of the mastic by weight, are usually available within a short distance of the scene of coating operations. Asbestos fiber, which constitutes 1 per cent, is also readily available. Asphalt, constituting 11 to 14 per cent, is usually a plentiful by-product of any oil company's refining operations. Locally available asphalt may be refined to meet coating specifications, which call for a 21 to 25 penetration at 77° F. for cold-line service. The special pipe primer, or its equivalent, may be shipped to the scene of operations in drums or in tankcars when jobs are of sufficient magnitude.

Asphalt-mastic coating is applied at the company's permanent central plant, at a temporary rail-head plant, or at the pipe-line trench. The work on most of the mastic-coated pipe used in southern California was done at the central plant, formerly at Kettleman Hills, and now at Watson, Los Angeles County, California. From the central plant the coated pipe is transported by truck, or by rail and truck, to the trench in which it is to be laid. Above the trench the joints are welded together. An 8-inch uncoated section at the ends of each joint permits the usual welding operations.

After the pipe is welded the bare joint sections are coated over the trench. In this operation the primer is applied first, then a clamp or mold is placed over the section to be coated. This is filled with mastic at a temperature sufficiently high to cause it to combine with the adjacent plant-applied mastic. The clamp is closed to mold the mastic to the proper shape, and the material is allowed to cool before the clamp is removed.

When a rail-head plant is used, the pipe is unloaded from the cars and coated in the same manner as at the central plant, except that smaller, more portable equipment is used. The coated joints are trucked to the trench, where welding and field-joint coating take place, as in the former case.

The foregoing methods are applicable only to the installation of new lines. For reconditioning old lines the over-the-trench method of application was devised. This process makes use of an ingenious wheel-mounted coater assembled so that the old line, uncovered and hoisted from the ditch, passes through its center. As this applicator passes along the line it applies the coating, which is extruded from nozzles simultaneously over the entire circumference in a continuous process. It is preceded by crews which sand-blast and prime the line.

The over-the-trench coater can be used on screwed as well as welded lines, provided care is taken to obtain sufficient thickness of the mastic over the collars by using suitable molds. Pipe bends are no hindrance.

Properties of asphalt-mastic coating have been demonstrated by its use under various field conditions. During 1936 10 miles of pipe was removed from an abandoned line in the San Joaquin Valley near Los Banos. This pipe had been coated with asphalt-mastic when it was laid in 1930, in soil in which bare pipe had lasted only two to three years before replacement became necessary. In reclaiming this coated pipe the field-joint coatings were removed, and the pipe was cut and beveled. Inspection revealed no signs of deterioration. This record was attributed to the thickness of the coating, its high electrical resistance, maintained because of its freedom from water intrusion, its inherent strength to resist soil stresses and its intimate bond with the pipe.

The intimacy of the bond and toughness of the coating were further demonstrated when this same 10 miles of pipe was loaded on trucks and carried 300 miles to the Los Angeles Basin where it was relaid in corrosive soil without any noticeable damage to the coating from the moving and rough handling.

In the Wilmington field several important characteristics of mastic coating have been noted besides preventing the ravaging effects of salt water. In thickly populated areas of this type a great number of pipe bends are necessary. Due to the ductility of the mastic, the coated joints are bent on the job to meet field requirements without injuring the coating. Ninety-degree bends can be made at a radius of 20 or more pipe diameters at ordinary field temperatures.

One of the hardest services for coated pipe is on lines which alternately carry hot and cold oil. Much California oil requires heating before it is transported in pipe lines. Asphalt-mastic coating has been found desirable for this service because of its high heat insulating properties. Also, its

Complete field joint on Somastic-coated joint

strength to resist soil stresses is not impaired by temperature ranging up to 180 degrees, according to the manufacturers. The tendency of pipe to creep in the ditch when the temperature of the oil in the line is changed places great stresses on the coating. With its maximum-density aggregate, mastic coating is said to offer sufficient resistance to flow at high temperatures to escape injury from this action.

Soil stresses are encountered in nearly all locations due to expanding and shrinking of soil as it alternately becomes wet and dry. Besides resistance to flow, high tensile strength is needed to prevent the coating from splitting.

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Leases and Drilling Blocks

SECURITY ABSTRACT COMPANY
El Dorado, Union County, Arkansas, Magnolia, Columbia County, Arkansas. Fee, Lease and Mineral ownership on short notice. Ownership maps.

LEASES—East Texas, La., South Ark. 20 acres up, dollar acre up. Owners—Address Attorney, Box 1122, Little Rock, Ark.

WHY PAY big prices for Oil Leases when potential land in fee, all royalty, can be bought for $5. Investigate. J. N. SWANSON, Sayre, Oklahoma.

DRILLING deals wanted 50,000 acres Southern Illinois in and around production area. Elmer Gant, Anna, Illinois.

BUY UNDER DRILLING WELL ON SABINE UPLIFT
Will sell small part of our leases in 10, 20, and 40 acre tracts to help meet expenses of drilling well which is now down 500 feet, on south flank of Sabine Uplift, Louisiana.
Also have limited number of producing royalties in Duval County, Texas.
JOSEPH E. POPKINS
Natl. Press Bldg., Washington, D. C.

FOR SALE—Blocks of 100 to 10,000 acres 5 to 10 year term oil and gas leases located on structures near oil and gas producing wells. Two structures are geologically approved. Depth of drilling 450 to 800 feet. W. P. Harley, Bowling Green, Kentucky.

ILLINOIS 60,000 acres in and near production. Illinois Minerals Company, Cairo, Illinois.

HAVE large block leases on approved structure close to producers, shallow drilling, accessible. Willing to make good terms to have this drilled.
F. M. SHIDELER, Mancos, Colorado.

NOTICE
500 acres, 5 yr. leases—Northern Clay County, Illinois—5-N, 5-E. Will turn this for small bonus and a drilling contract. Leo H. Graves, Farina, Illinois.

WANT proven gas acreage under 2200 feet with good market, Oklahoma or Kansas. Box J-573, The Oil and Gas Journal, Tulsa.

NEW OIL FIELD at Ojo, Huerfano County, Colo. opens with gusher at 420 feet, with 48 gravity oil and heavy wet gas. Deeper production seems assured. Our test wells drilling. We own 30,000 acres covering both Ojo and Alamo structures. Will sell leases or royalties, small or large blocks. Drilling development wanted, no proration, high grade oil, railroad and highway service into the fields. S. W. Pressey, Box 614, Pueblo, Colo.

Leases and Drilling Blocks

N. MEX. weekly Oil Scout Report up to minute locations and developments. Send $1.00 for 2 months' service. Roy G. Barton, Hobbs, New Mexico.

100 A. S.W.¼, 8-3N-5W Grady Co., Okla. 10 A. leased producing well. Nine new wells joining, drilling two sides 1600-2800 ft. Ellen Woods, 337 S. Victor, Tulsa. Ph. 2-4770.

BREWSTER COUNTY—TEXAS
Offer small tracts of land in fee all minerals included CHEAP. Write A. C. Smith, P. O. 200, San Antonio, Texas.

SEVERAL surface mapped oil structures, edge Permian Basin. You check and deed me land, small mineral rights. Address Box J-540, The Oil and Gas Journal, Tulsa, Oklahoma.

N E KANSAS shallow gas acreage. Lease furnished and well drilled bottom hole money. Box 435, Lawrence, Kansas.

FOR SALE—75% interest in 840 acres semi-proven Oil and Gas leases near Celina, Tenn. Within one mile of proven acreage. Drilling rates reasonable. Frank H. Blum, Agent, 1205 Union Trust Bldg., Cincinnati, Ohio.

MY AUG.-SEPT. offers of 80 a. gas-proven, one well, $850 are all taken. October offers are: 80 or more acres. I drill one well on each, equip for gas, assign lease (Full 7/8) and well for $950 your total cost. 300% year on your money possible. Pipeline market pays 8c per M.
MR. BUDDENBORG
Osawatomie, Kansas.

BLOCK 20,000 ac. Mont. wildcat. Good geol. Gas at approx. 2,000, oil 6,000 ft. Unit leases one well validates or 10 cents rental. Market for gas. Will give good deal for immediate action. Address Box J-572, The Oil and Gas Journal, Tulsa, Okla.

ILLINOIS BLOCK
Of 3,000 acres. Interesting geological and geophysical characteristics. Located in 6 to 10 miles of production in three different directions, and no tests nearer. Attractive terms. Drilling must start by Nov. 1, 1938. Address: Eckerson, 155 Remsen St., Brooklyn, N. Y.

PARTY now conducting special geophysical exploration surveys for oil promise is often in contact with drilling block opportunities, leases, production, royalties and sometimes capital for development where favorable conditions exist. P. O. Box 364, Fort Worth, Texas.

Leases and Drilling Blocks

WILL sell 1000 acres offsetting lime well with 38 feet sand at 1087 feet, for $1.50 per acre. Good geology. Particulars Box 10, Kincaid, Kansas.

Situations Wanted

GRADUATE Engineer. 15 years' experience, oil and production and distribution natural gas, repressuring oil sands. 3 yrs. with state service commission regulating gas companies. Employed, desire change, prefer producing oil. Address Box J-553, The Oil and Gas Journal, Tulsa, Okla.

GRADUATE Petroleum Engineer with 20 years' experience as Drilling and Production Superintendent in Mid-Continent and Gulf Coast areas, 42 years old, Single. Now employed. Good reason for desiring change. Sober. Good habits. Good character. Excellent references. Address Box J-560, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER, 28, single, good health, 4 years' surveying experience, wishes position with oil company, preferably in South America, but will go anywhere. Address Box J-570, The Oil and Gas Journal, Tulsa, Oklahoma.

Help Wanted

WANTED—Mechanical Engineer familiar with oil field pumping equip. to take charge of mfg. and designing equip. State exp., age, and references. Replies strictly confidential. Address Box J-543. The Oil and Gas Journal, Tulsa, Okla.

For Sale—Maps

1938 REVISED EDITION
MAP of State of Texas, Eastern N. M., parts of Southern Okla., SW Ark. and La., shows Oil and Gas Fields in color, Counties, County Seats, elevations, coordinated alphabetical index of counties and fields. Price $1.00 postpaid

Write for descriptive folder of Oilfield and County Ownership Maps.
ZINGERY OIL MAP COMPANY
Fair Building Fort Worth

Legal Blanks

Since 1908 Burkhart's legal forms have served the Oil Industry—Free catalog & samples. Burkhart Printing & Sta. Co., 115 So. Cincinnati, Tulsa, Oklahoma.

Geophysical Service

CAN FIND any oil structure that will produce when penetrated. P. O. Box 303, Tonkawa, Oklahoma.

Royalties

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma.

Brokers—Salesmen
Sell in the most active area in the United States—The Permian Basin of West Texas and Southeastern New Mexico. From the standpoint of royalty investors this area has much to offer. Can supply you with choice non-producing royalties located on geophysical highs. Also drilling blocks, close in acreage to production, or wildcat leases. I maintain my own field men who cover this area for me. All offerings meet the requirements of the Security and Exchange Commission. Inquiries invited.
B. D. BUCKLEY
Paul Brown Bldg., St. Louis, Mo.

Producing and Non-Producing
OIL ROYALTIES
Registered Dealers Only
GRIMES ROYALTY CO.
Hunt Bldg. Tulsa, Okla.

ROYALTIES—ADEQUATE RESERVES
G. D. TERRIEN
412 Central Bank Bldg., Tulsa, Okla.

PRODUCING OIL ROYALTIES
15 years of experience.
L. H. WITWER
703 Kennedy Bldg., Tulsa, Okla.

NEW MEXICO Oil and Gas Leases and royalties. Send 50 cents in stamps for new State Oil Map of New Mexico. Roy G. Barton, Hobbs, New Mexico.

WRITE US TODAY
For our offering of producing and nonproducing oil royalties.
RUBUSH and COMPANY
1307 Pacific Ave. Dallas, Texas.

DEALERS, in royalties, leases, working interests, we have what you want for your trade. Active territory, low prices. Fast service. W. J. DOBBS, 632 Wilson Building, Dallas, Texas.

Financing

CAPITAL SEEKERS—Put your project before 260 Key-Men. Cost trifling. Details free. AMSTER LEONARD, Fox Theater Building, Detroit, Michigan.

INQUIRIES SOLICITED FROM CORPORATIONS INTERESTED IN RAISING CAPITAL THROUGH THE MARKETING OF CORPORATE SECURITIES.
BROWN HARTWELL COMPANY
110 EAST 42 ST., NEW YORK

"NEW type capital financing by banks" started August 1938. 1500-word mimeo. bulletin $1.00. List of America's 64 leading underwriters who bought $300,000,000 in securities in 3 months of 1938. $3.00. JOHN MORRIS, 1040 South Paxon, Philadelphia, Pennsylvania.

Survey Service

THE DOWSING METHOD for locating oil structures, faults, and treacherous areas, operates on the principal of vibratory response to emanations from petroliferous sub-strata. Our WATSON No. 1 pioneer well of the Wilmington, Calif. field was located by this method and all my personally owned production. 15 years' experience. This physico method may solve all your structural difficulties. Geo Miller, 1548 Post Avenue, Torrance, California. Phone 983.

Oil Industry Printing

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

CLASSIFIED DISPLAY RATES

Classified Display is set with a border and may be used in one or two column sizes.

1 Inch	*1 time*	*$5.00*
1 Inch	*13 times*	*4.50 per inch*
1 Inch	*26 times*	*4.00 per inch*
1 Inch	*52 times*	*3.50 per inch*

This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY.

CLASSIFIED

Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White-space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgement is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times		1 time	2 times	3 times	4 times
3 Lines	*$1.05*	*$1.80*	*$2.55*	*$3.30*	*7 Lines*	*$2.45*	*$4.20*	*$5.95*	*$7.70*
4 Lines	*1.40*	*2.40*	*3.40*	*4.40*	*8 Lines*	*2.80*	*4.80*	*6.80*	*8.80*
5 Lines	*1.75*	*3.00*	*4.25*	*5.50*	*9 Lines*	*3.15*	*5.40*	*7.65*	*9.90*
5 Lines	*1.75*	*3.00*	*4.25*	*5.50*	*10 Lines*	*3.50*	*6.00*	*8.50*	*11.00*

We reserve the right to withhold all advertising of questionable character. To avoid delay be sure to send remittance with copy. We will set your ad in the smallest amount of space possible and refund all overpayments. One-time insertions will not be run until fully paid. Forms close MONDAY NOON before each issue date.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma